SERVICE MANUAL ISCUS Flex 8003200

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1. Description

ISCUS Flex is a selective chemistry analyser designed for the small sample volumes obtained when sampling with Microdialysis. Sample volumes are 0.2 – 2.0 µL per test, reagent volumes 5.0 – 14.8 µL per test depending if it is clinic or pre-clinic.

This product is CE marked in conformity with the requirements of the Invitro Diagnostic Device Directive 98/79/ EEC.

Use only CMA Microdialysis spare parts, accessories and consumables.

CMA authorised personnel shall perform all service. ISCUS Flex shall be serviced once every 12 months by a qualified service engineer certified by CMA.

Read the SAFETY chapter before servicing the ISCUS analyser.

The movements of the microprocessor controlled sample- and reagent cannula is based on a XZ co-ordinate principle, while the sample- and reagent tray moves in the Y co-ordinate. This allows the system to locate samples, reagents and calibrator. "X" is left to right, "Z" is up and down.

Samples are collected in specially designed sealed microvials that are placed in a microvial holder. The microvial holder has 3 positions for direct analysis and 1 position for the analysis of control samples. The sample cannula pierces the upper stopper of the microvial to aspirate a sample. The sampling arm is equipped with a cannula guide that also secures the sample vial in position when sample is aspirated.

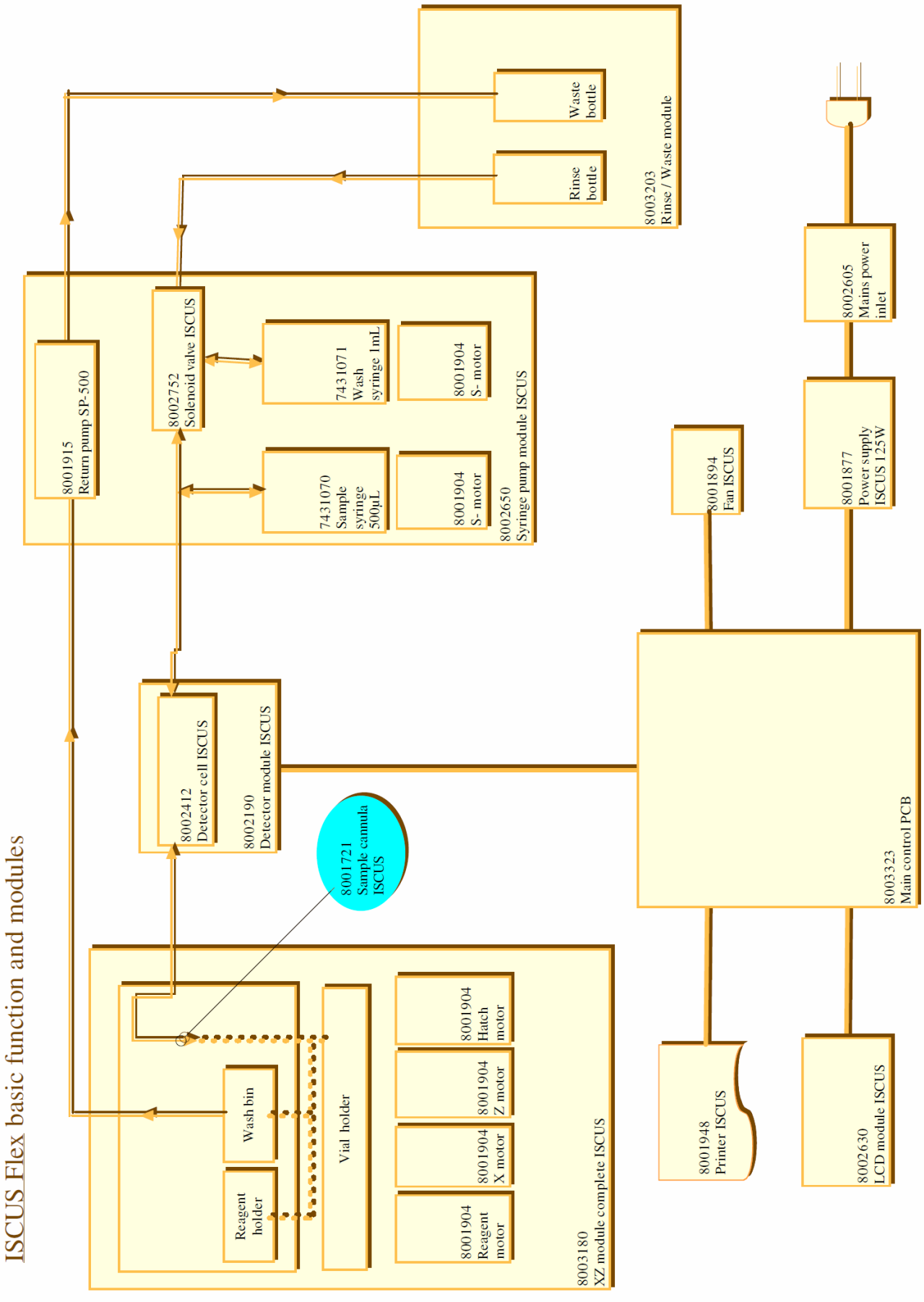
There is a reagent cassette holder for the reagent cassettes. The sample/reagent cannula pierces a membrane in the cap of the reagent and calibrator bottles to aspirate reagent or calibrator.

Reagent and sample volumes are controlled by a precision glass syringe of 500 µL.

A second syringe of 1000 µL is used to rinse the cell and sample/reagent cannula with rinsing fluid. A solenoid valve is used to select between washing of the system and filling with rinsing fluid.

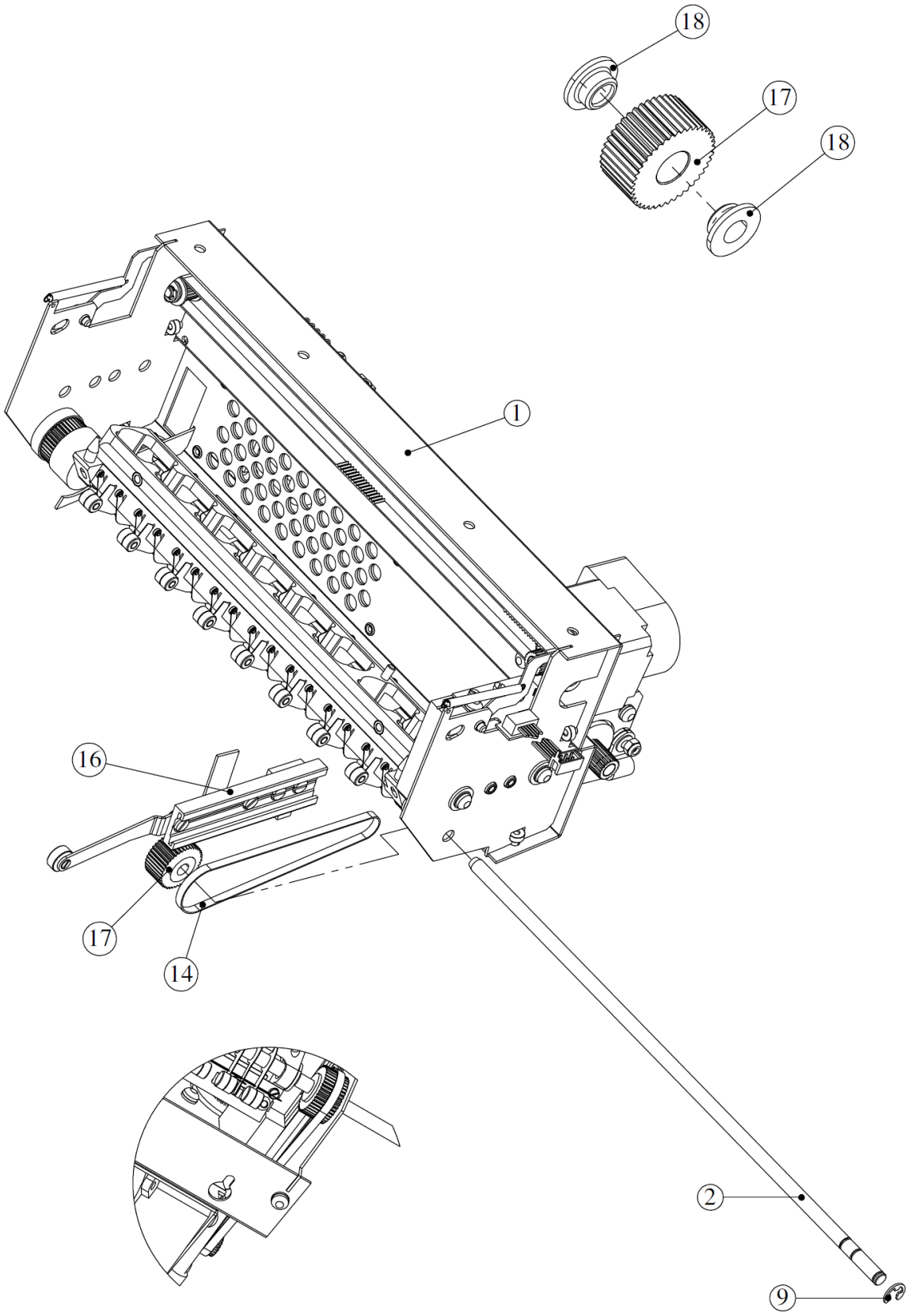
Absorbance measurements are made with a single-beam filter photometer, using a horizontal placement of a capillary flow cell relative to the light path. Two different Class 1 LEDs with the wavelengths of 530 nm and 375 nm choose the wavelength respectively.

2. Block-diagram

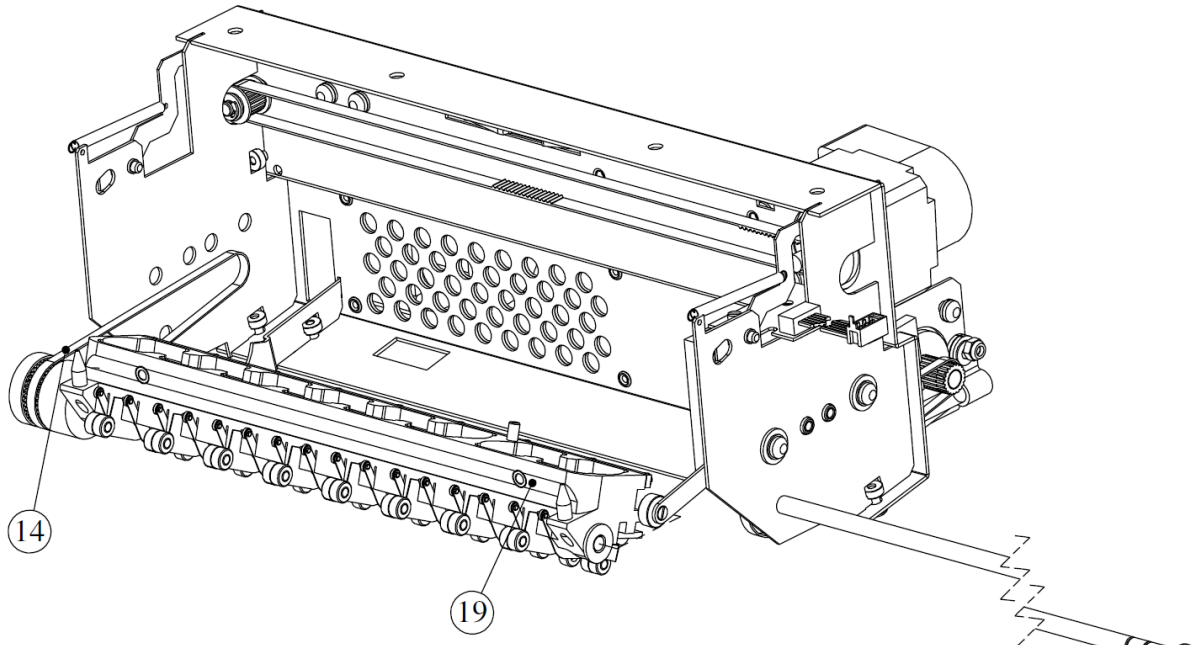


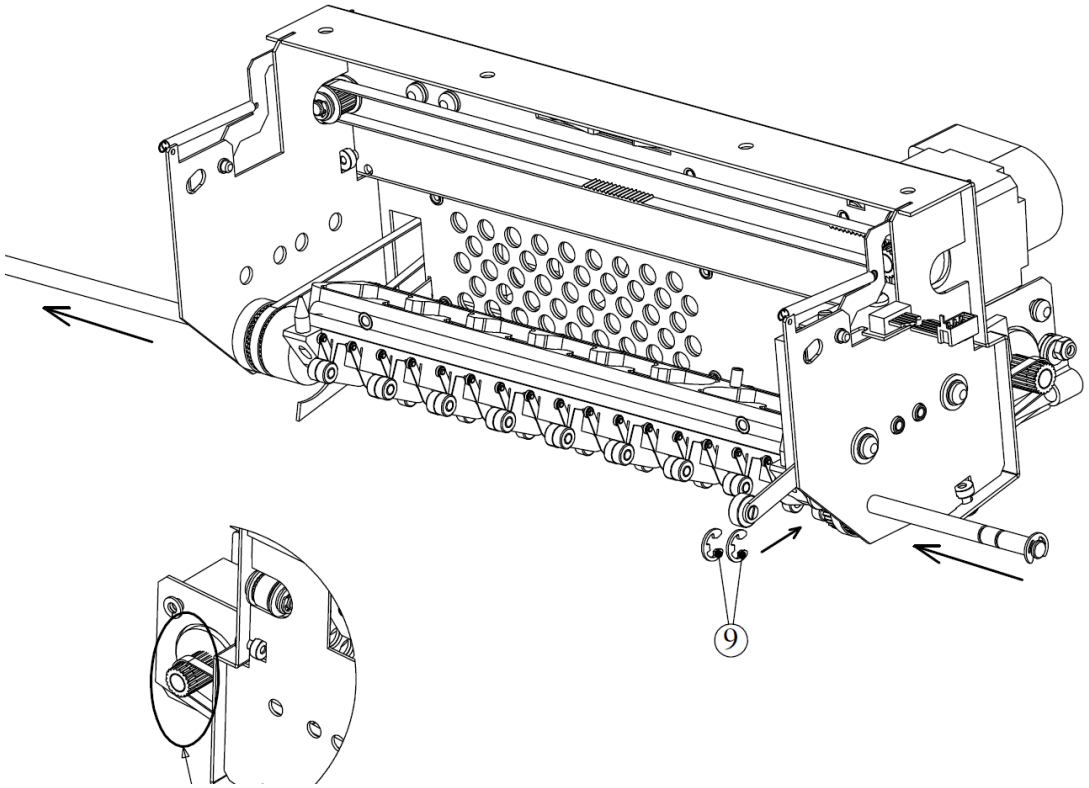
3. Assembly drawings

8003180 XZ-Module

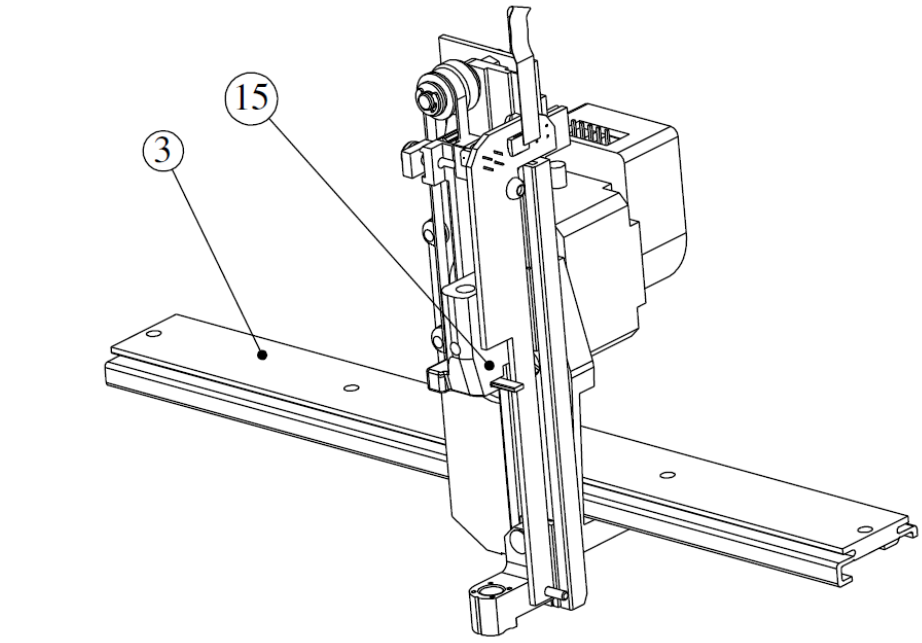


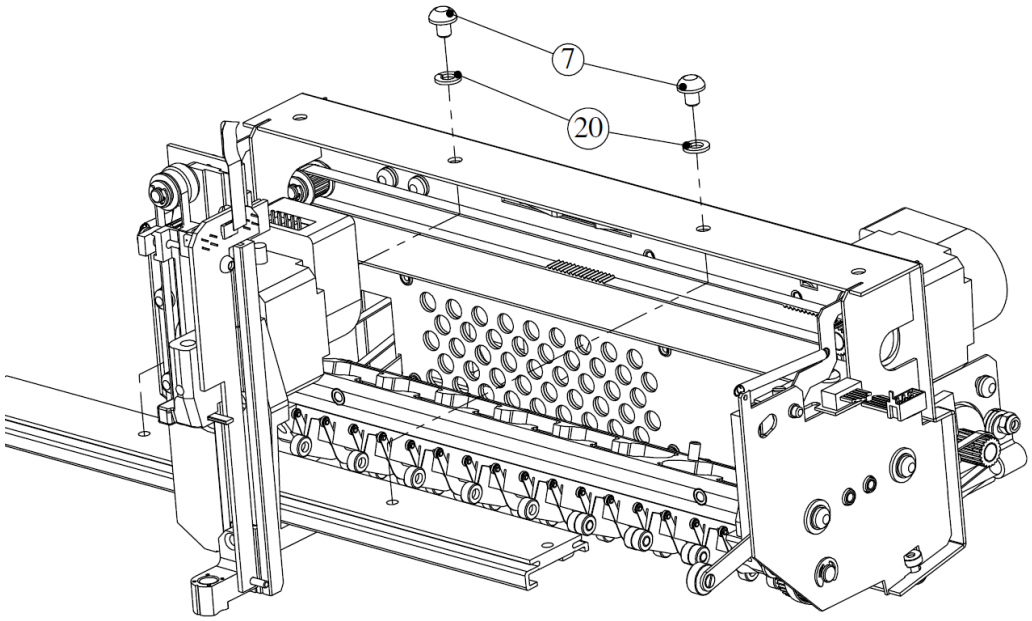
8003180 XZ-Module



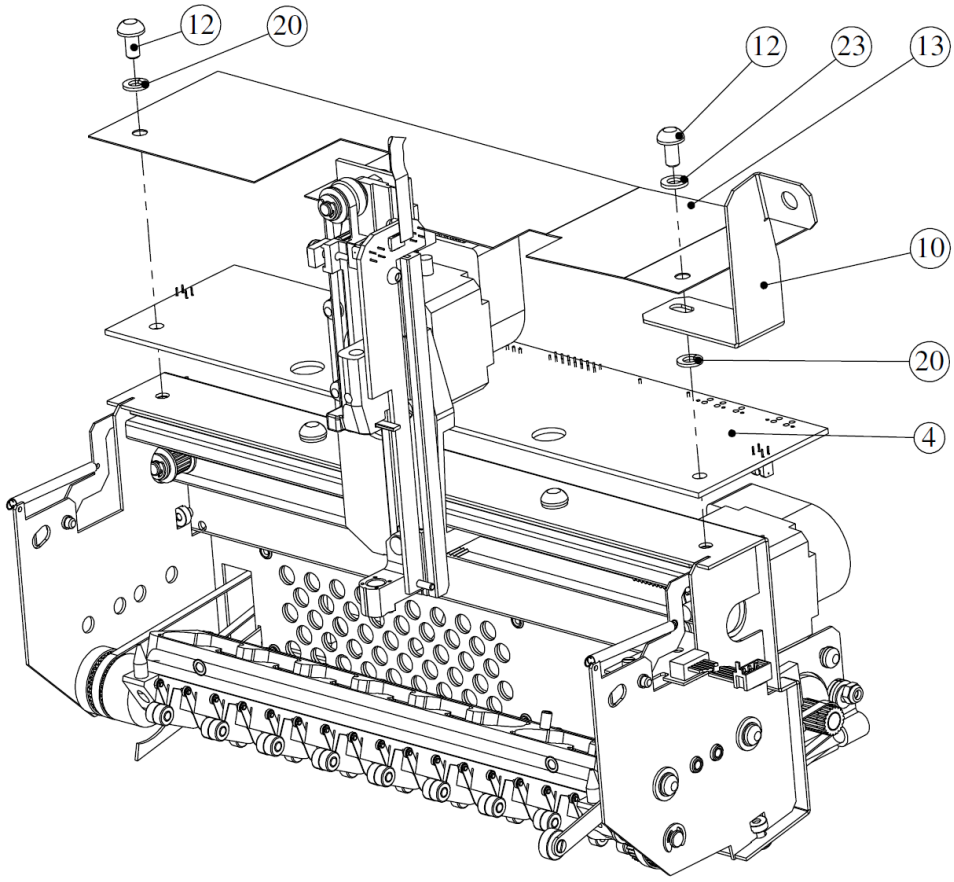


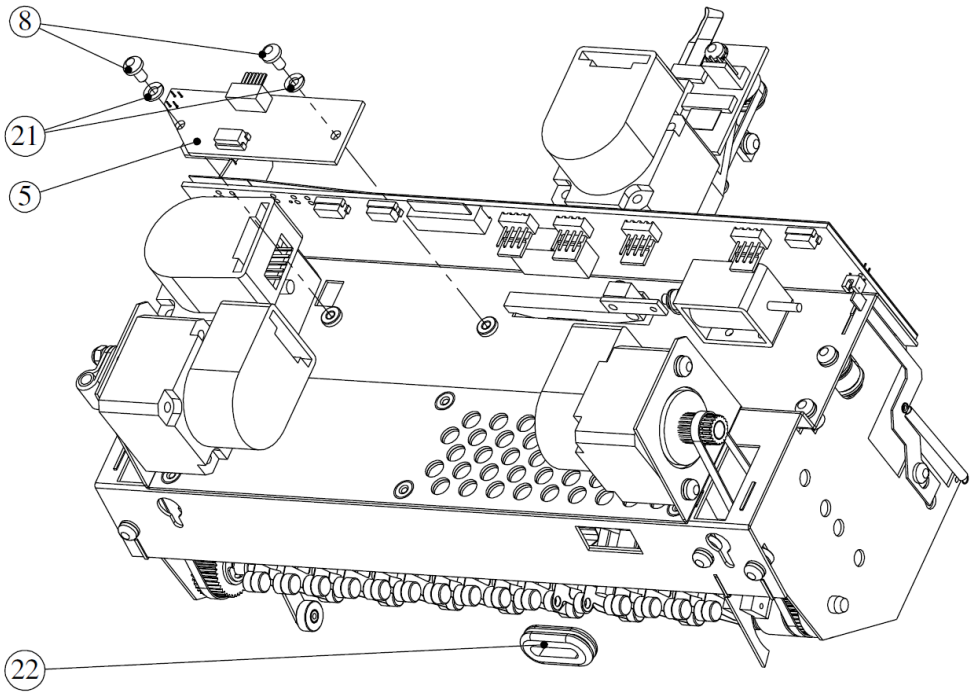
8003180 XZ-Module



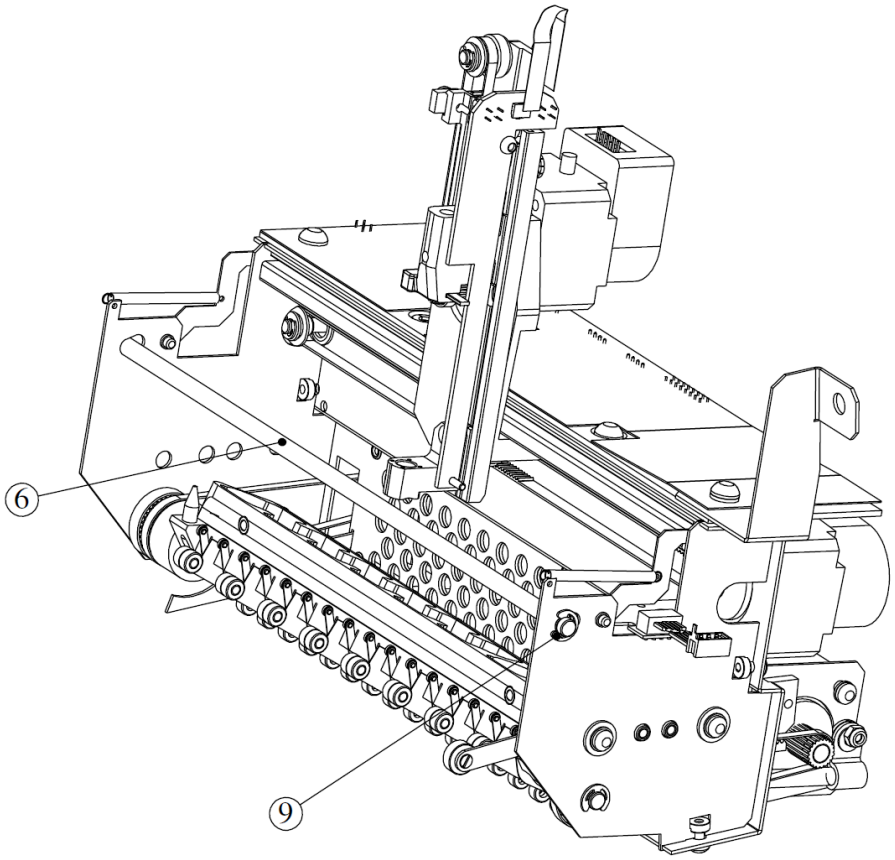


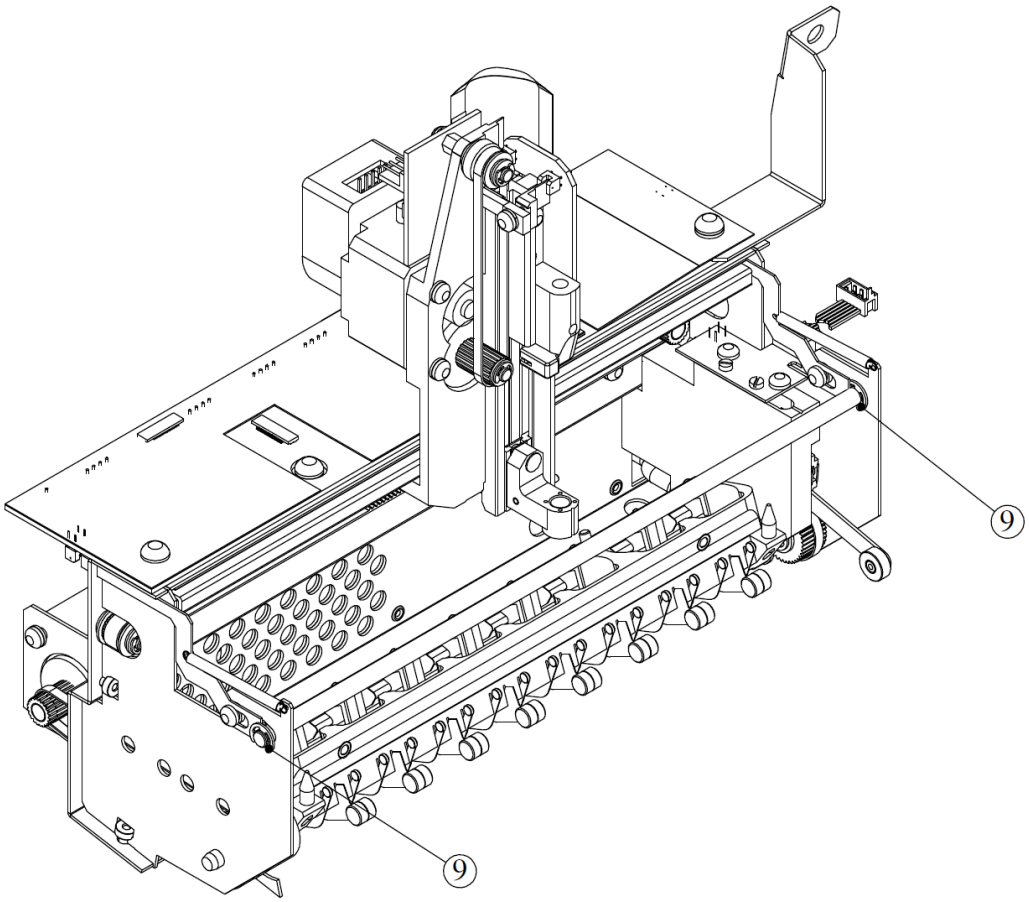
8003180 XZ-Module





8003180 XZ-Module

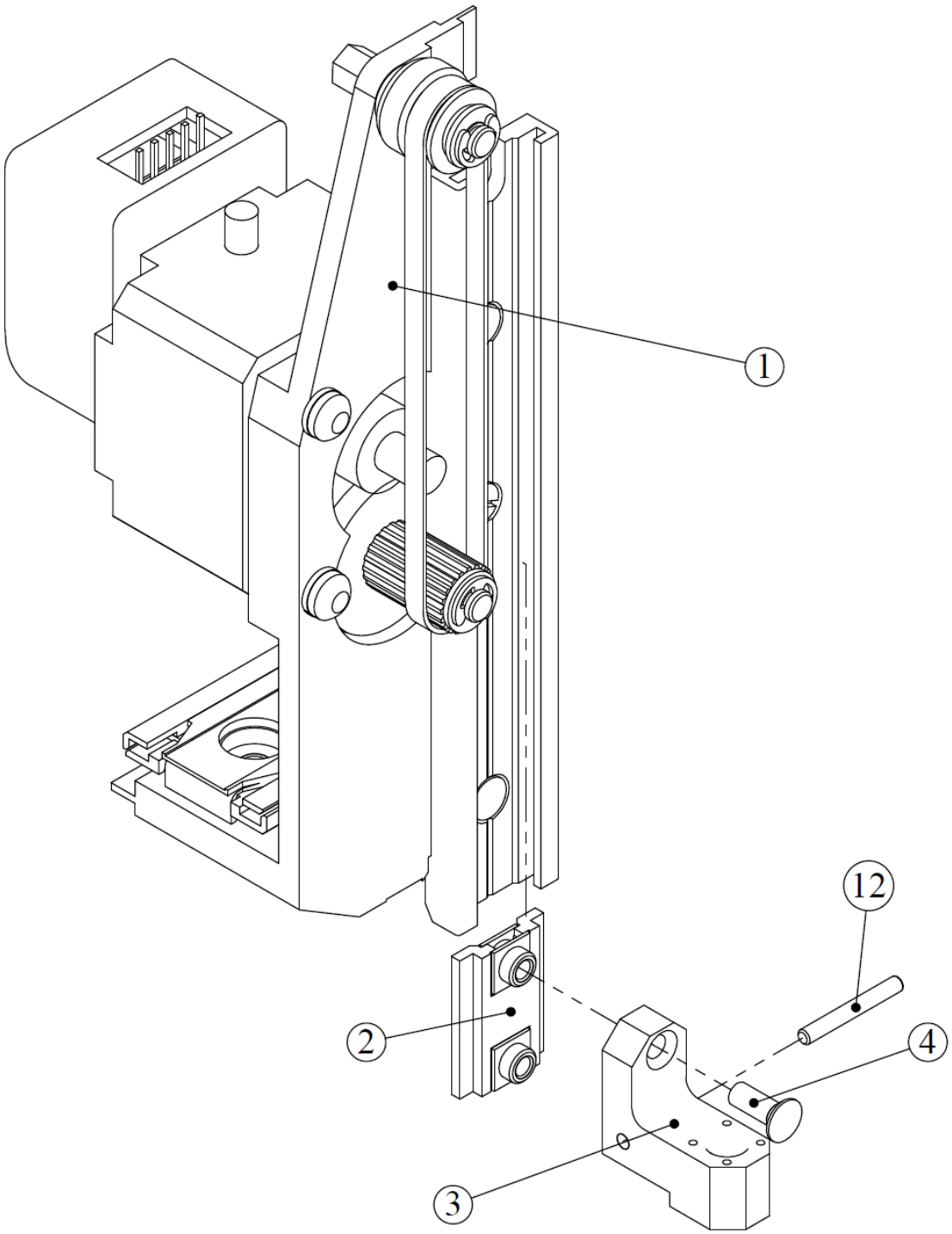




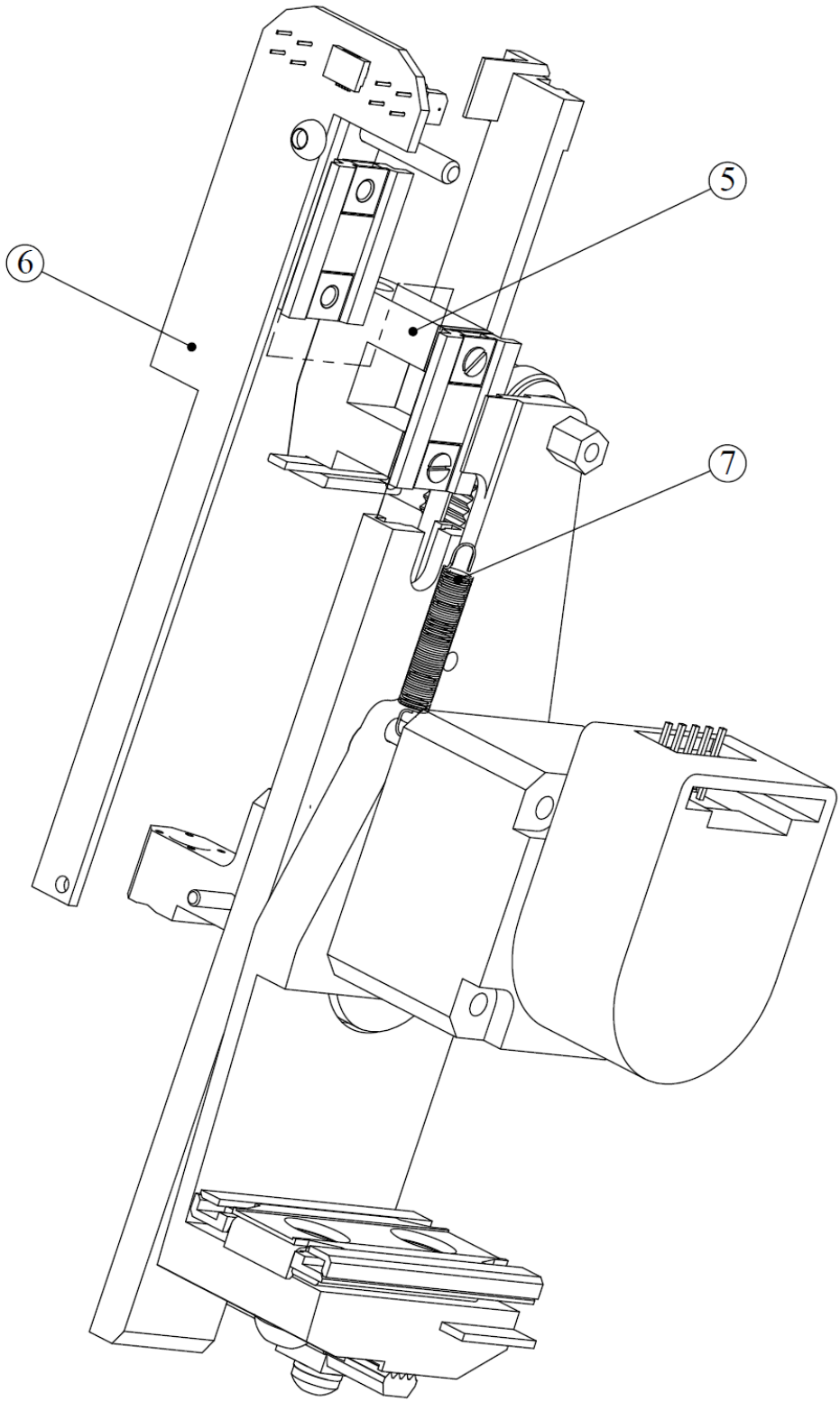
8003180 XZ-Module parts list

Position	*CMA P/N*	*Description*	*Qty*
1	8003181	Chassis complete	1
2	8003173	Shaft	1
3	8003194	X-rail	1
4	8003175	PCA ISCUS Flex connection board	1
5	8001705	PCA ISCUS Flex X-home sensor	1
6	8003188	Shaft Rubber stopper sensor	1
7	8001837	Screw MRT M4x5	2
8	8002302	Screw MRT M3x6	2
9	75130400	Locking clip RS 4	6
10	8002619	Support arm	1
12	8001831	Screw MRT M4x8	2
13	8002692	Insulating sheet	1
14	8003307	Tooth belt TN15	2
15	8003222	Z-module ISCUS Flex	1
16	8003240	Lid Opener compl.	1
17	8003232	Tooth wheel TN15-40	1
18	8003387	Bearing	2
19	8003237	Cassette holder compl.	1
20	8003314	Washer FBB 4,1	2
21	8003313	Washer FBB 3,1	2
22	8002696	Cable grommet	1

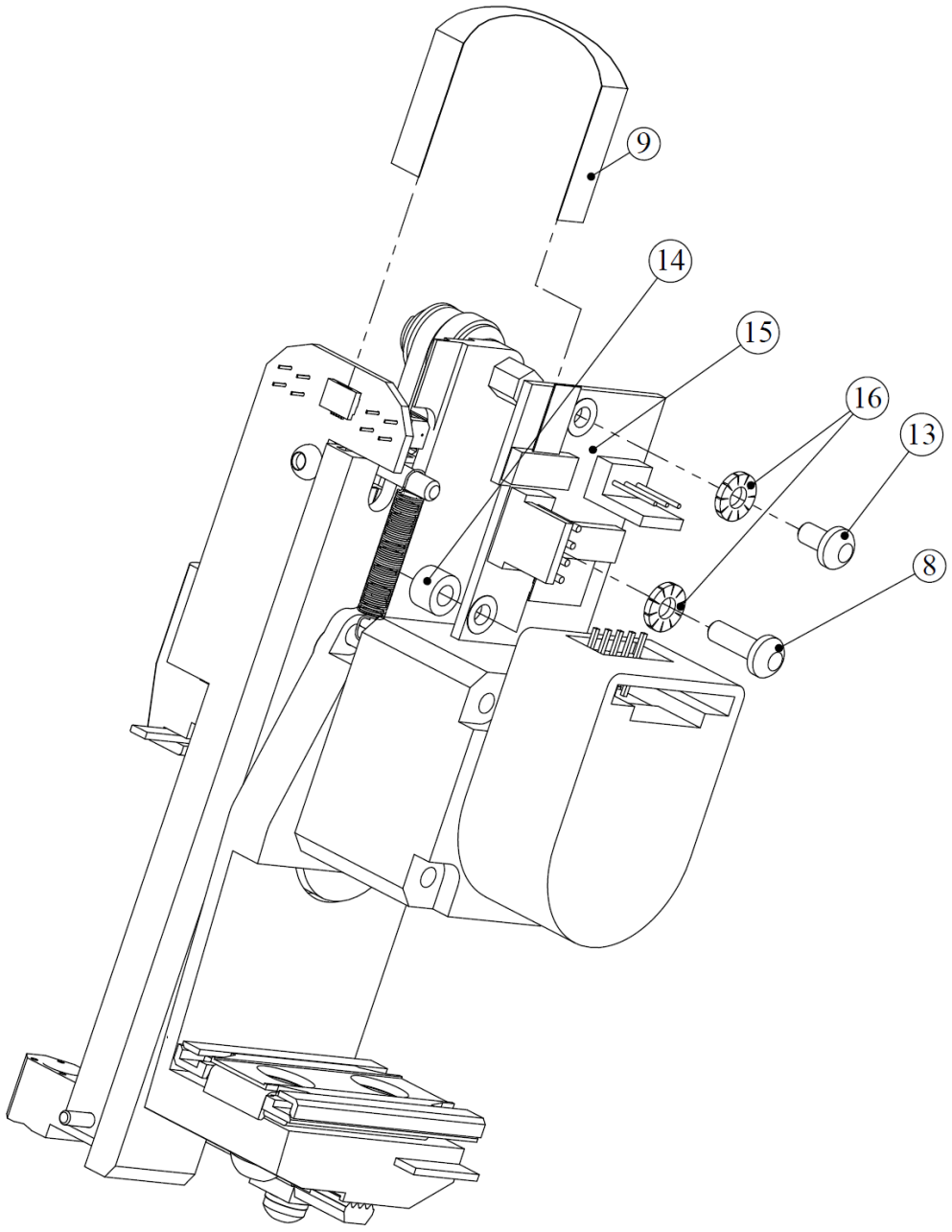
8003222 Z-Module



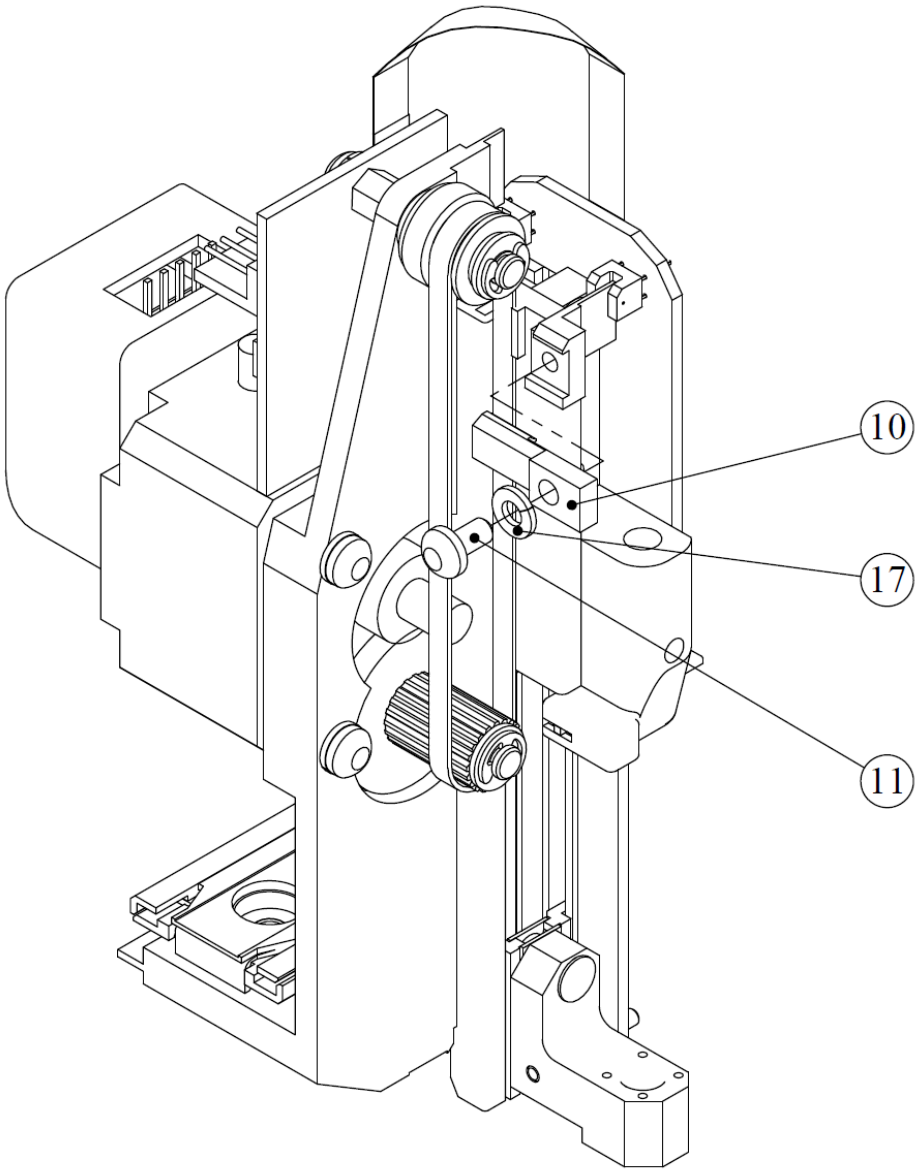
8003222 Z-Module



8003222 Z-Module



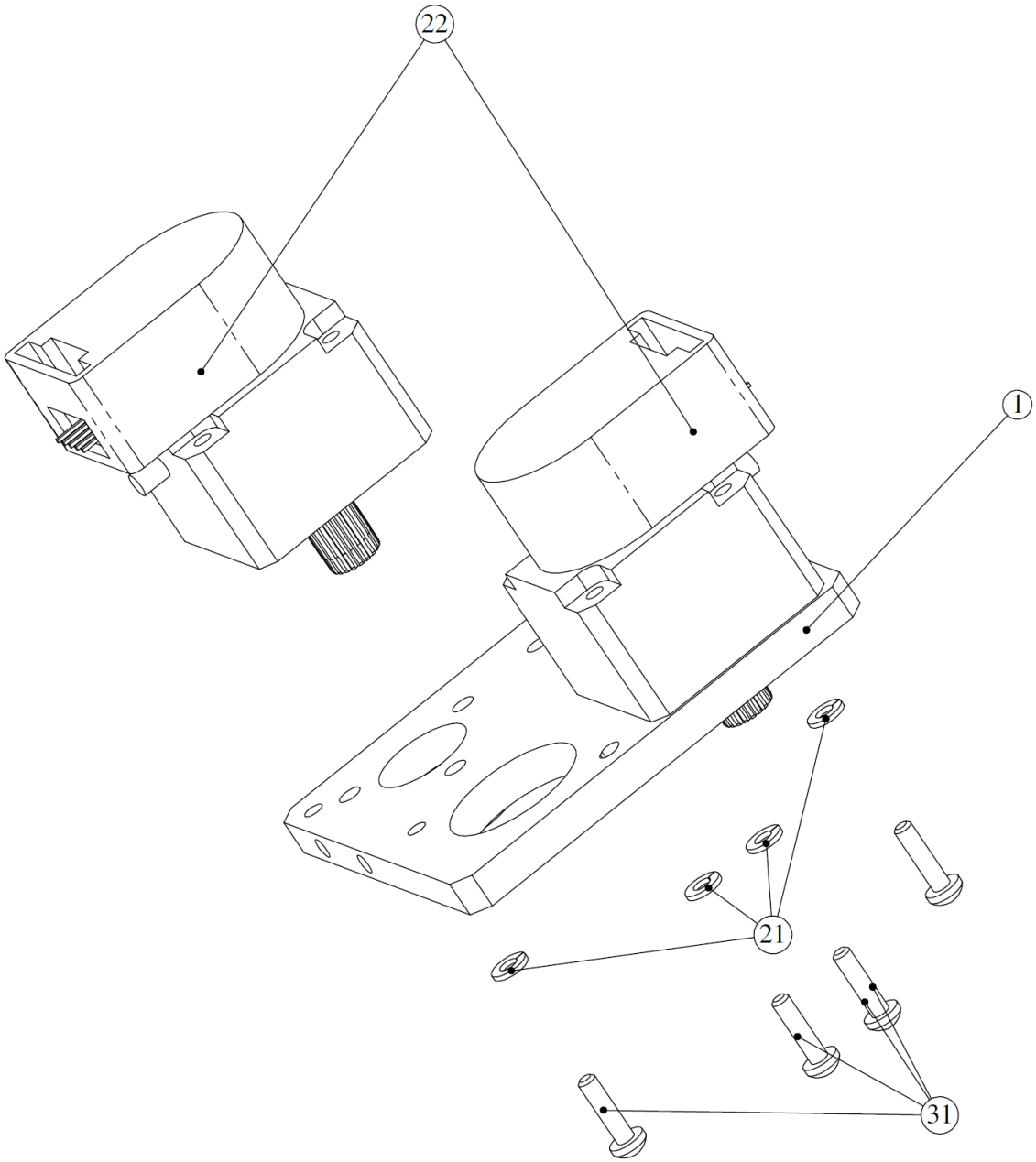
8003222 Z-Module



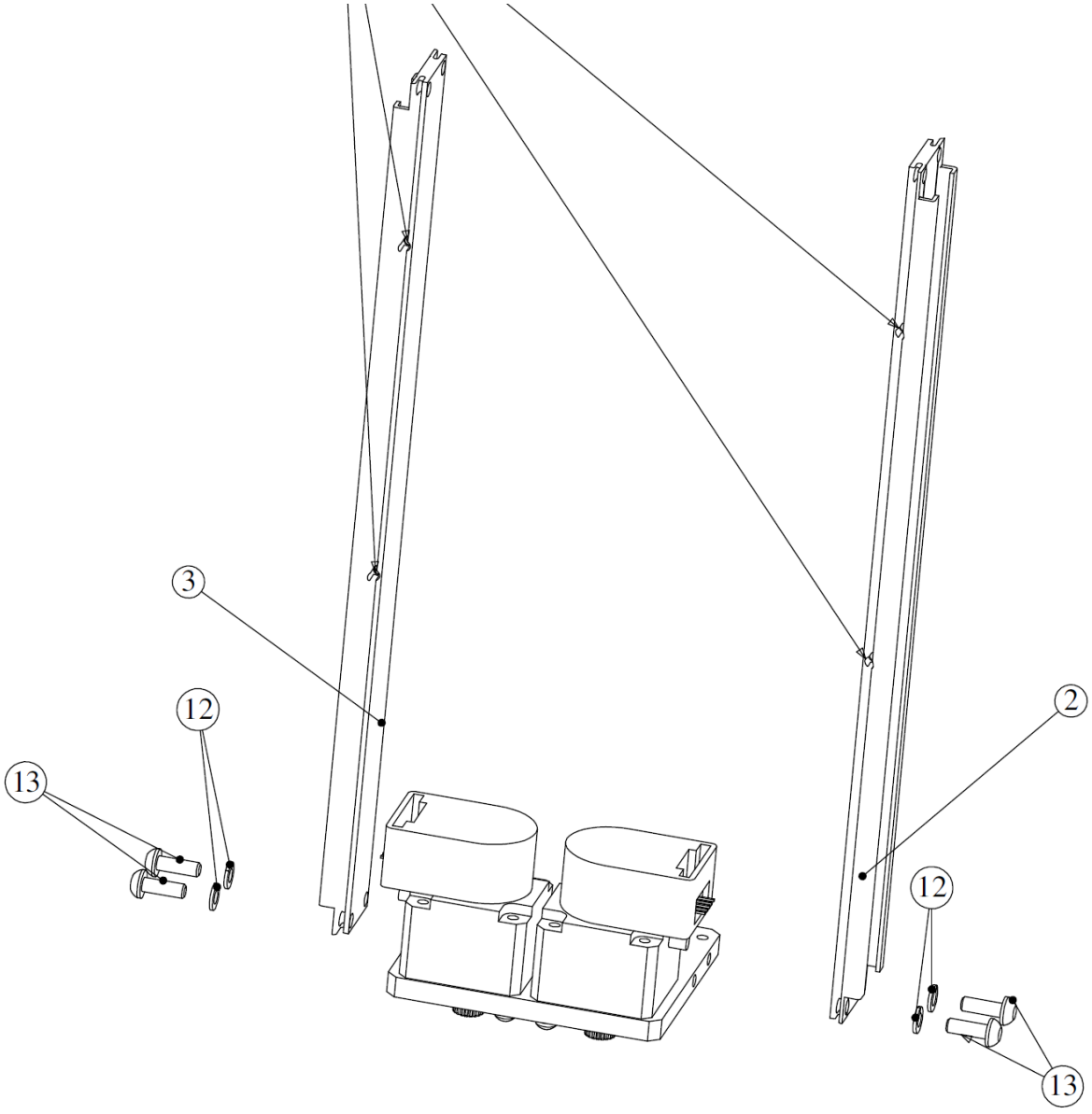
8003222 Z-Module parts list

Position	*CMA P/N*	*Description*	*Qty*
1	8003221	Carriage complete	1
2	8001852	Slide bearing NW 02-17 special	1
3	8001716	Cannula guide	1
4	8002390	Screw MFT 3x8 A4	1
5	8001717	Cannula holder compl.	1
6	8001855	Z-circuit board complete	1
7	8002404	Spring	1
8	75403010	Screw MRT M3x10	1
9	8001895	CAB ISCUS Flat Z	1
10	8001769	Z-cable Locker for tooth belt	1
11	8002302	Screw MRT 3x6 A4	1
12	M000322	Pin CP h8 2x16 A2	1
13	8001835	Screw MRT M3x8	1
14	8001821	Spacer DRN 3160 x4	1
15	8003227	PCA XZ CB compl.	1
16	75140320	Washer AZ 3,2	2
17	8003313	Washer FBB 3,1	1
18	8002490	P Molex 6471 1x3	1
19	5870030	P HY Crimpterminal	3
20	8002461	CAB ISCUS Encoder Z	1

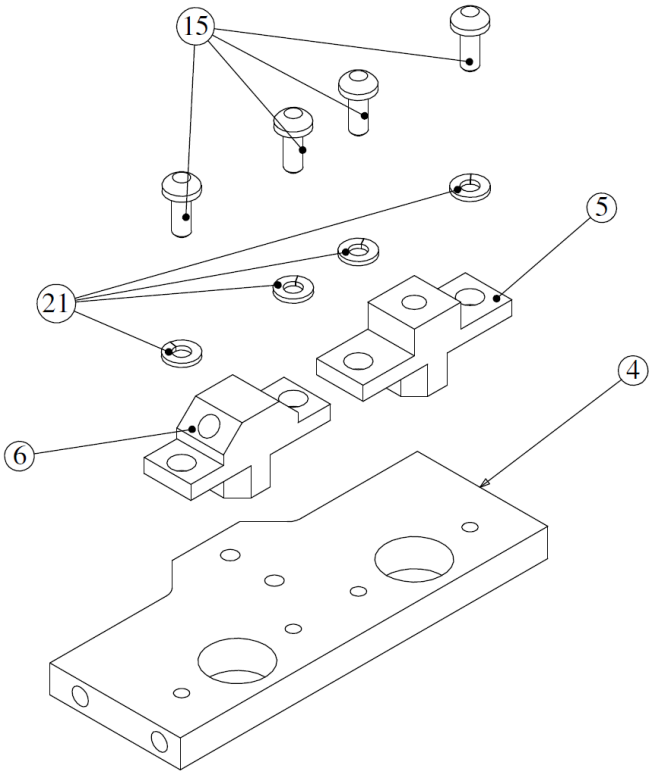
8002650 Syringe pump Module

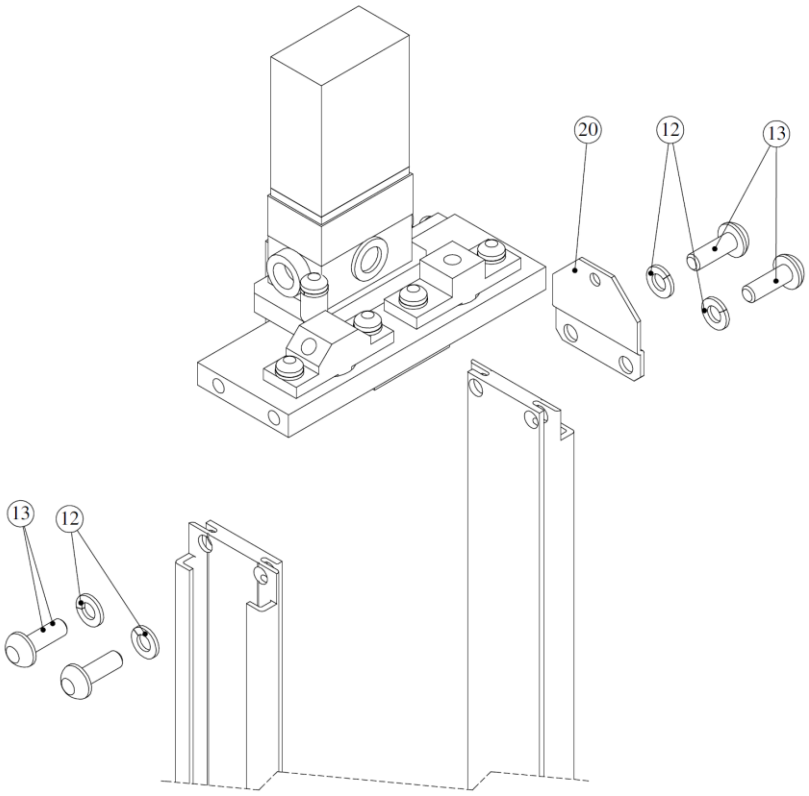


8002650 Syringe pump Module

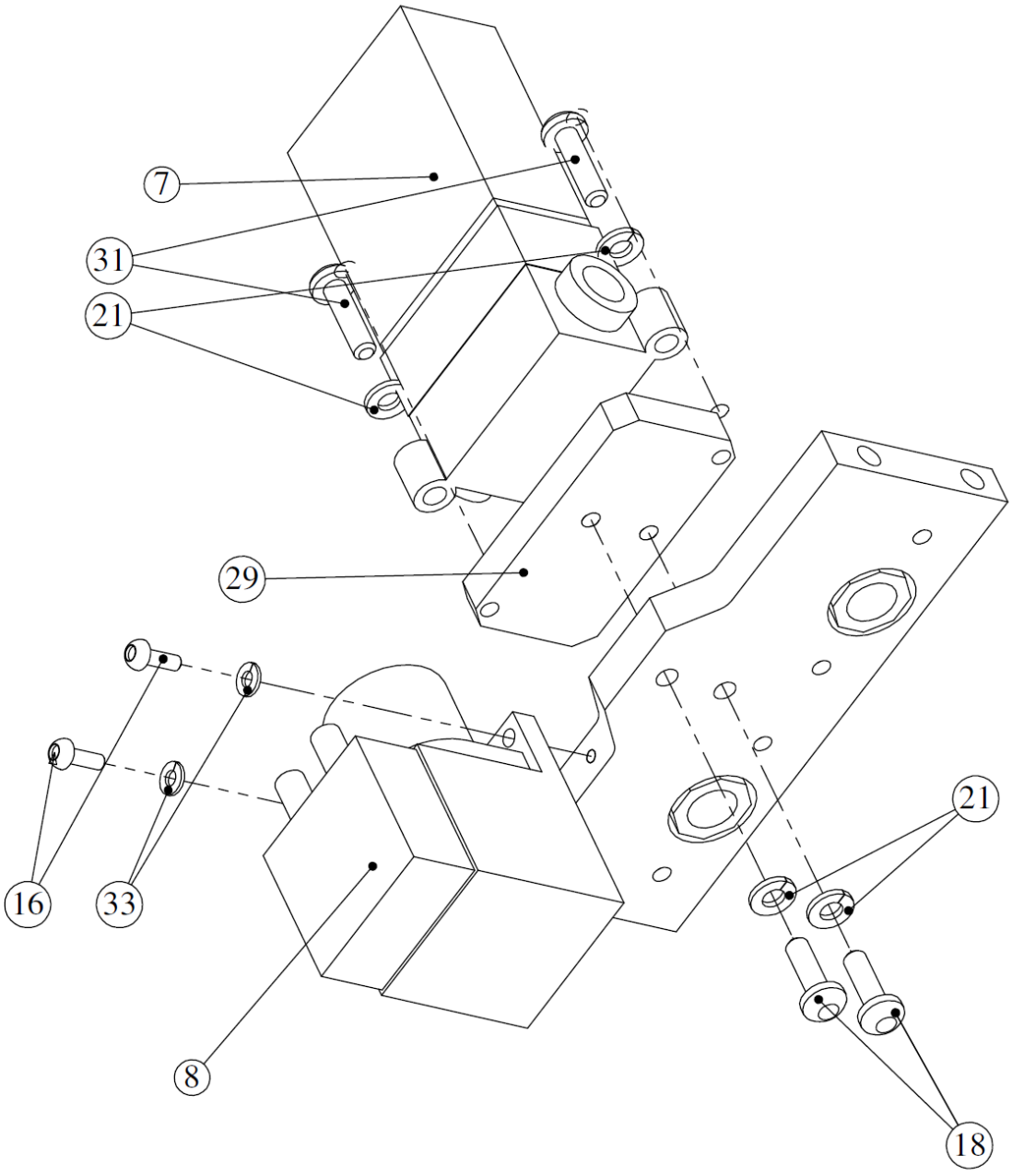


8002650 Syringe pump Module

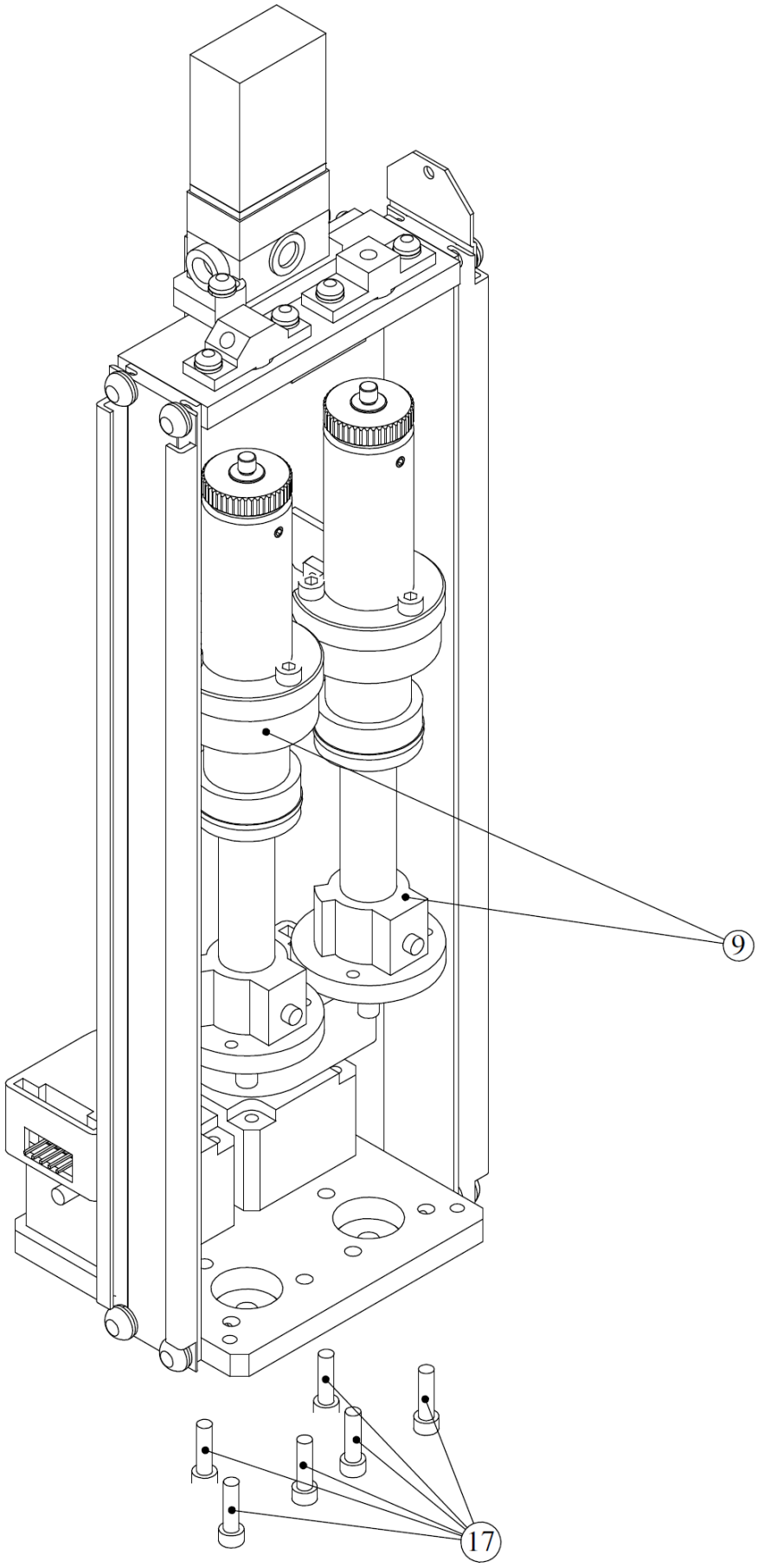




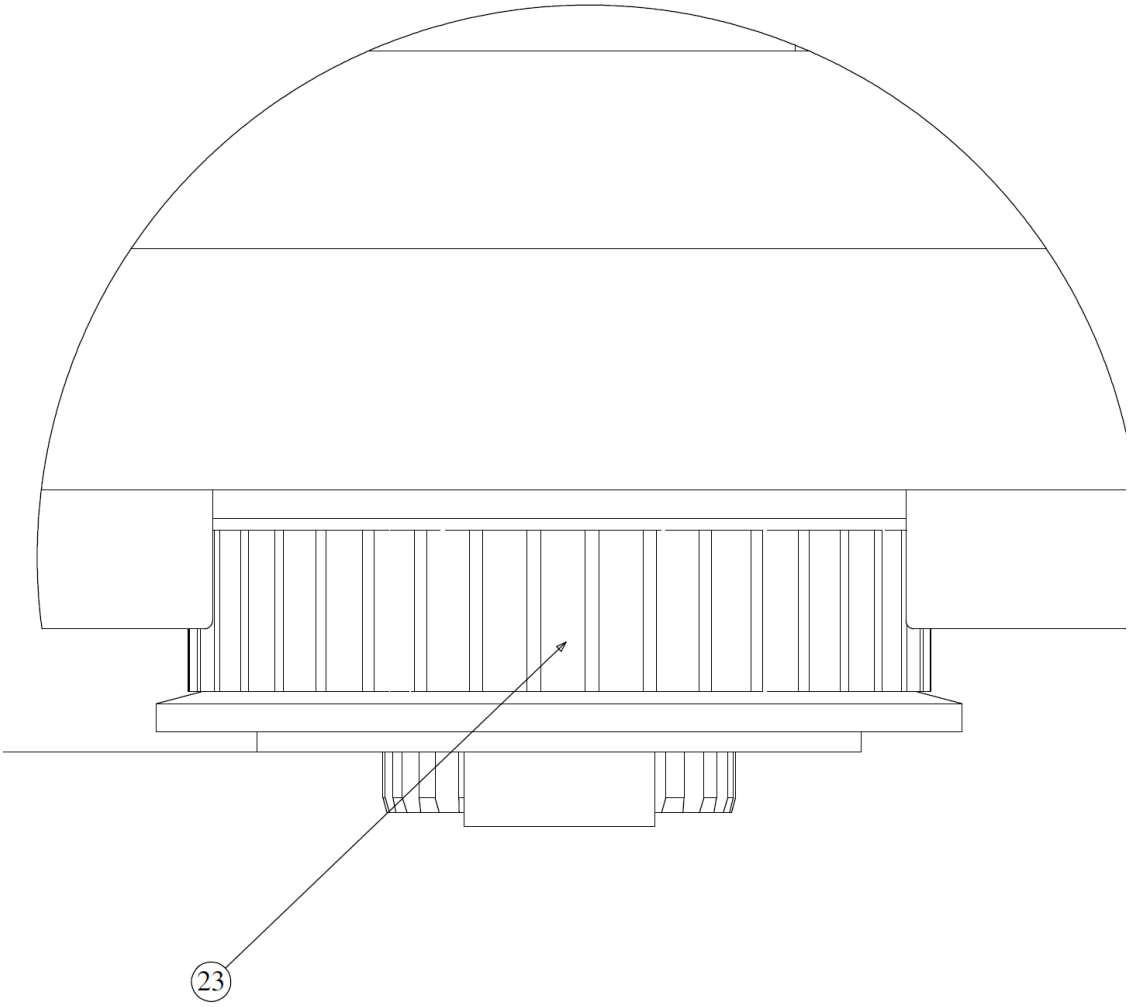
8002650 Syringe pump Module



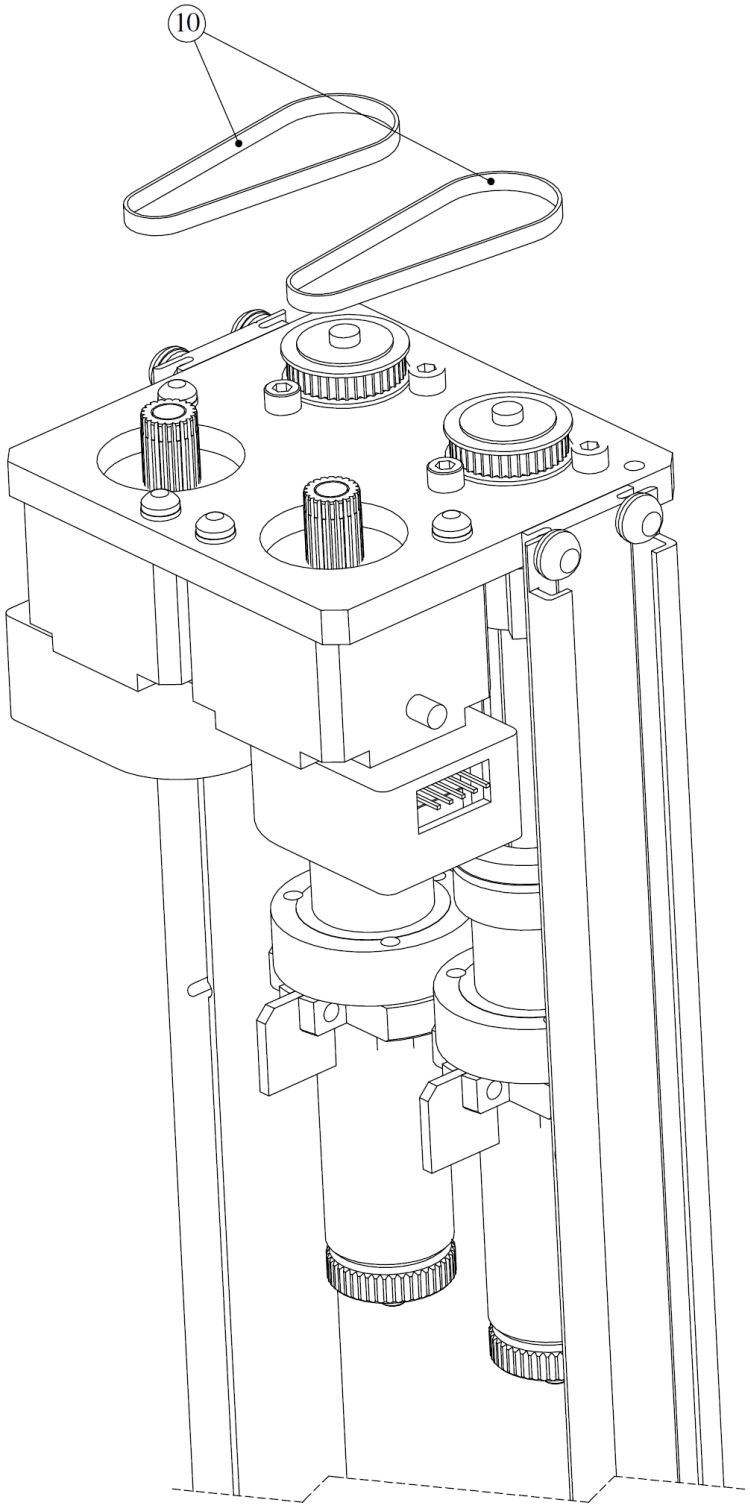
8002650 Syringe pump Module



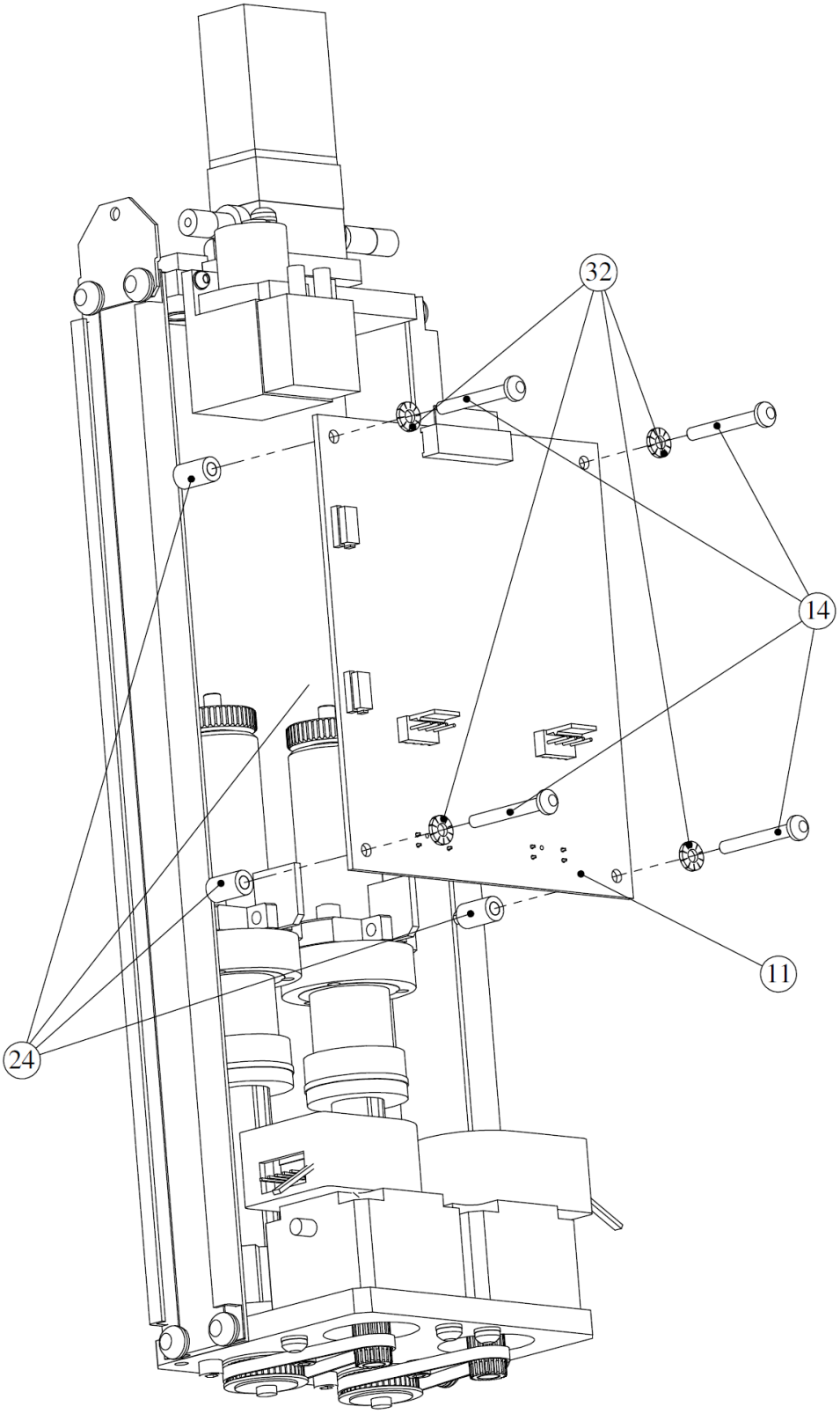
8002650 Syringe pump Module



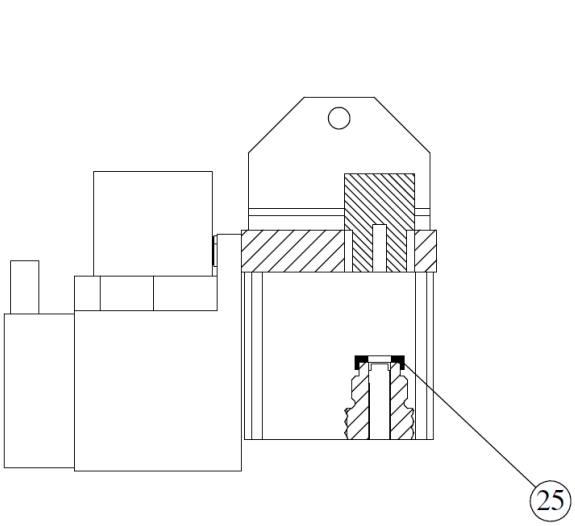
8002650 Syringe pump Module



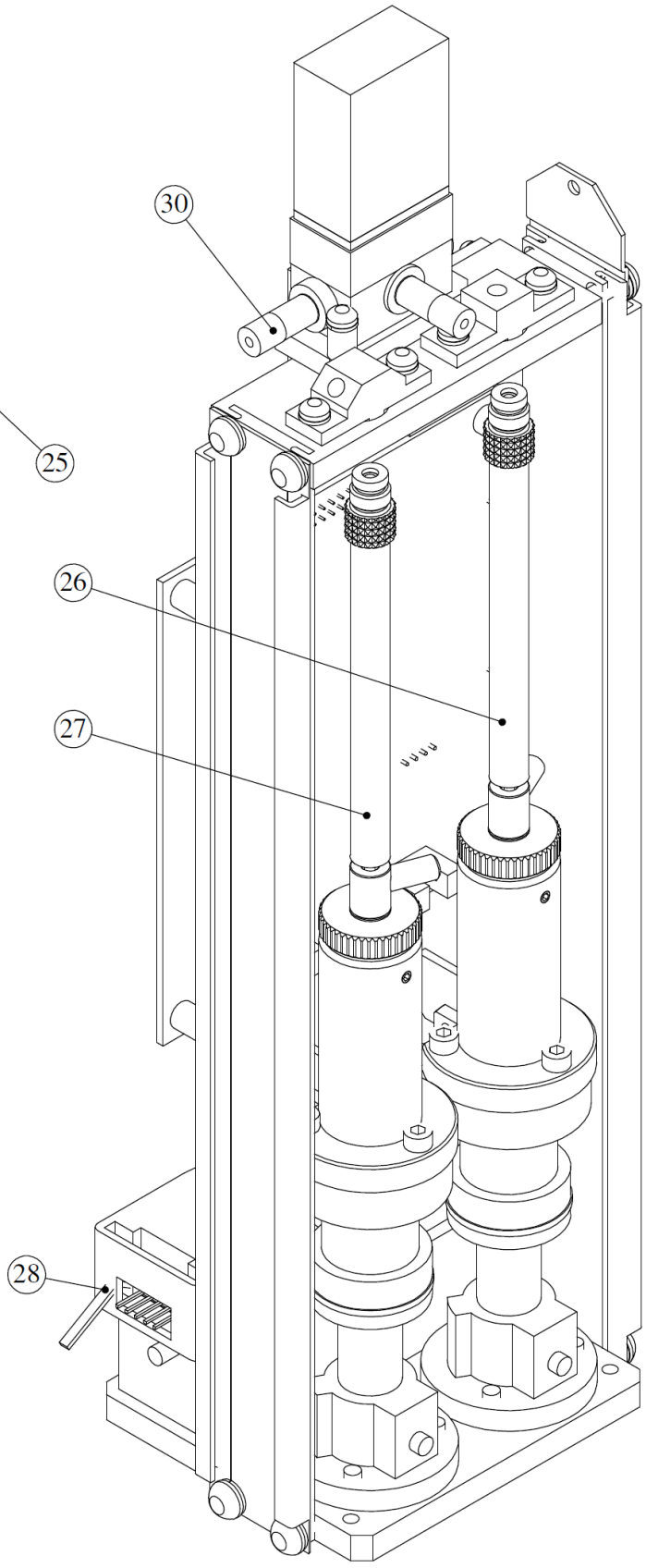
8002650 Syringe pump Module



8002650 Syringe pump Module



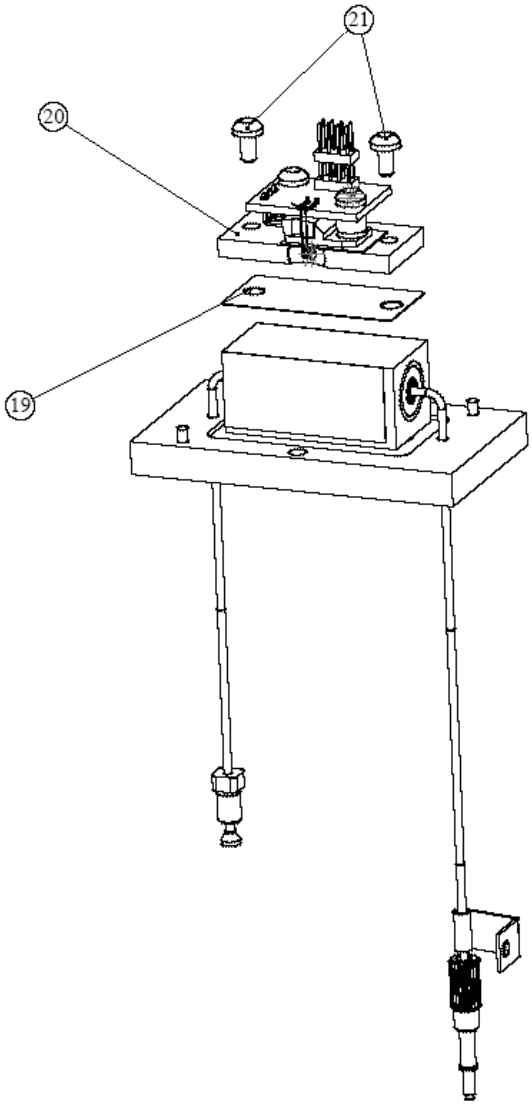
SECTION B-B
SCALE 1 : 1



8002650 Syringe pump Module parts list

Position	CMA P/N	Description	Qty
1	8001912	Pump bottom plate	1
2	8001917	Pump side left	1
3	8001918	Pump side right	1
4	8001919	Pump top plate	1
5	8001878	Syringe adapter wash	1
6	8001913	Syringe adapter sample	1
7	8002752	Solenoid valve	1
8	8001915	Return pump	1
9	8001908	Drive screw complete	2
10	8001916	Tooth belt 79TN15	2
11	8001923	PCB ISCUS Syringe pump compl.	1
12	8003314	Washer FBB 4,1	8
13	8001475	Screw MRT M4x12	8
14	8002525	Screw MRT M3x25	4
15	8001835	Screw MRT 3x8	4
16	8002213	Screw MRT 2x6	2
17	8001911	Screw UC6S A2 UNC 6-32x13	6
18	75403010	Screw MRT 3x10	2
20	8002214	Pump support	1
21	8003313	Washer FBB 3,1	12
22	8001904	Stepper motor complete	2
23	8001875	Tooth wheel compl. TN 15z40	2
24	8002526	Spacer DRM 3260x10	4
25	D000011	Gasket syringe to syringe adapter	2
26	7431071	Syringe 1 ml for ISCUS	1
27	7431070	Syringe 500 µl for ISCUS	1
28	8002695	Locker for connector	2
29	8002785	Spacer	1
30	8002754	Finger tight Fitting	3
31	8001819	Screw MRT M3x12	6
32	75140320	Washer AZ 3,2 lock	4
33	8003311	Washer FBB 2,1	2

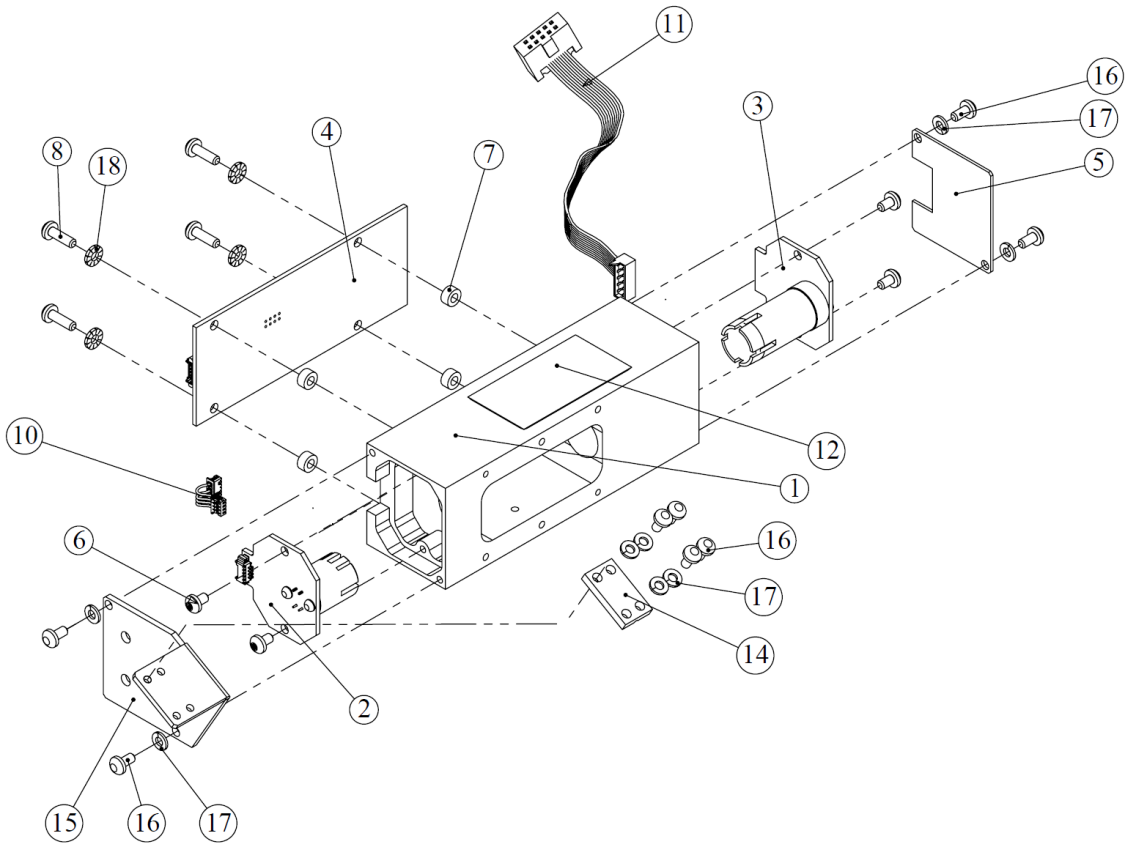
8002412 Detector cell

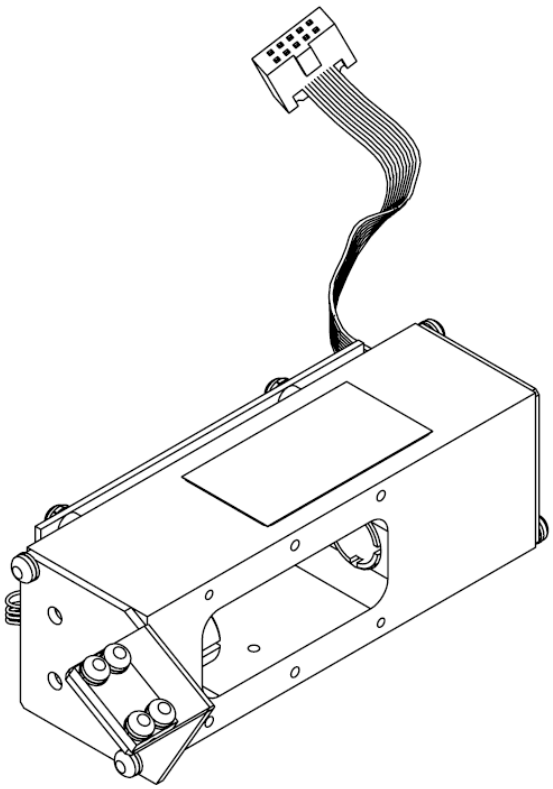


8002412 Detector cell parts list

Position	CMA P/N	Description	Qty
19	8001814	Isolation pad	1
20	8001812	Heating block	1
21	8001973	Screw MRT 3x6 A4	2
Not nr.	M000032	Nut KEL-F	1
Not nr.	M000033	Ferrule KEL-F	1

8002190 Detector module

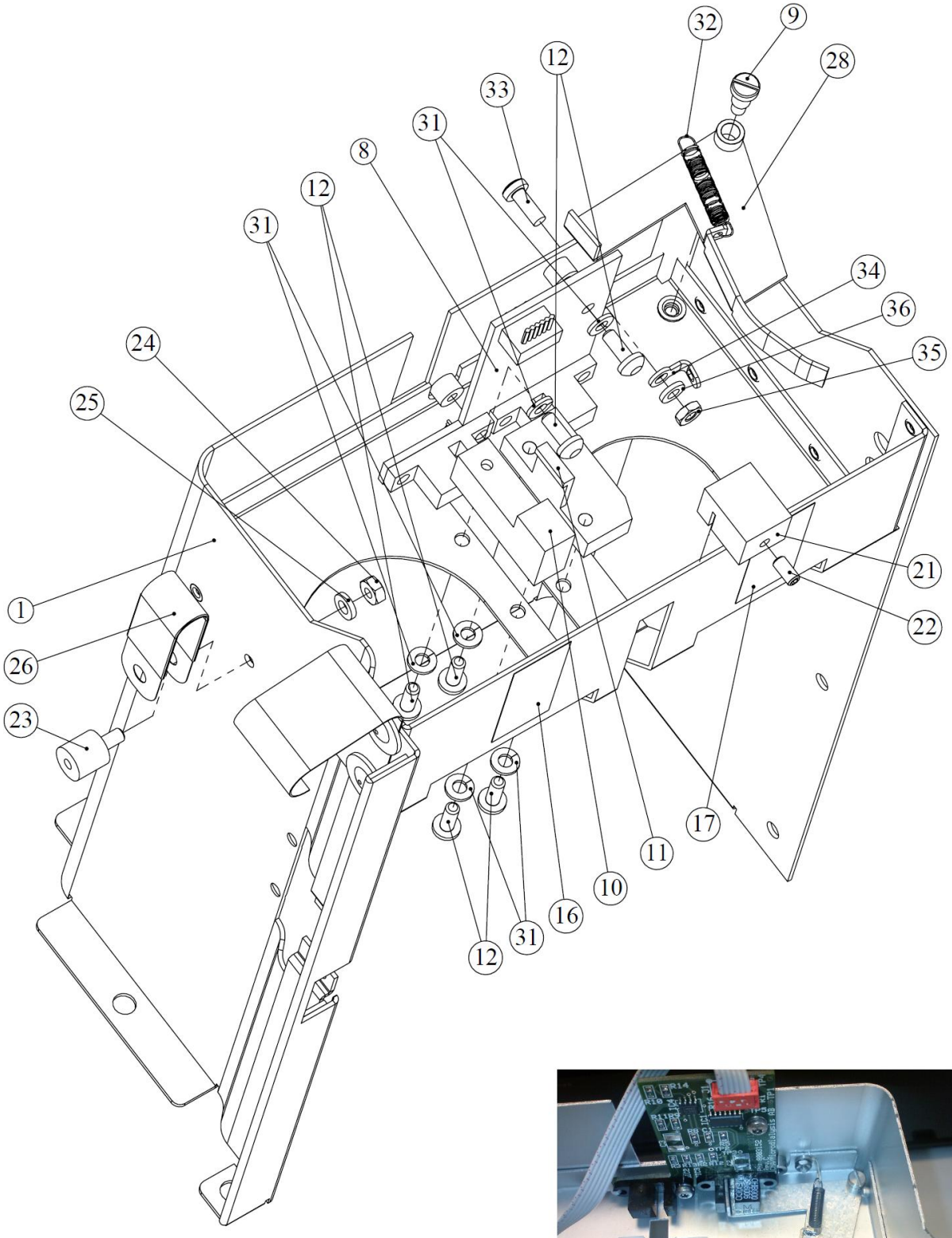


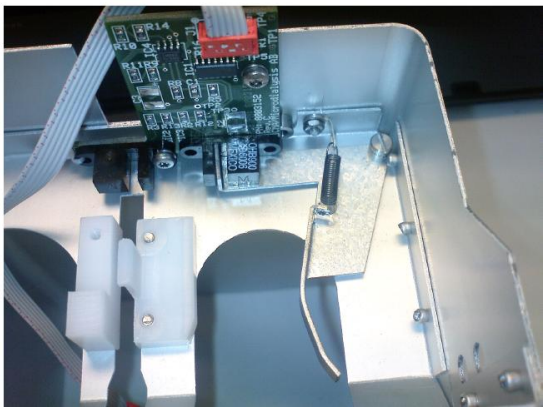


8002190 Detector Module parts list

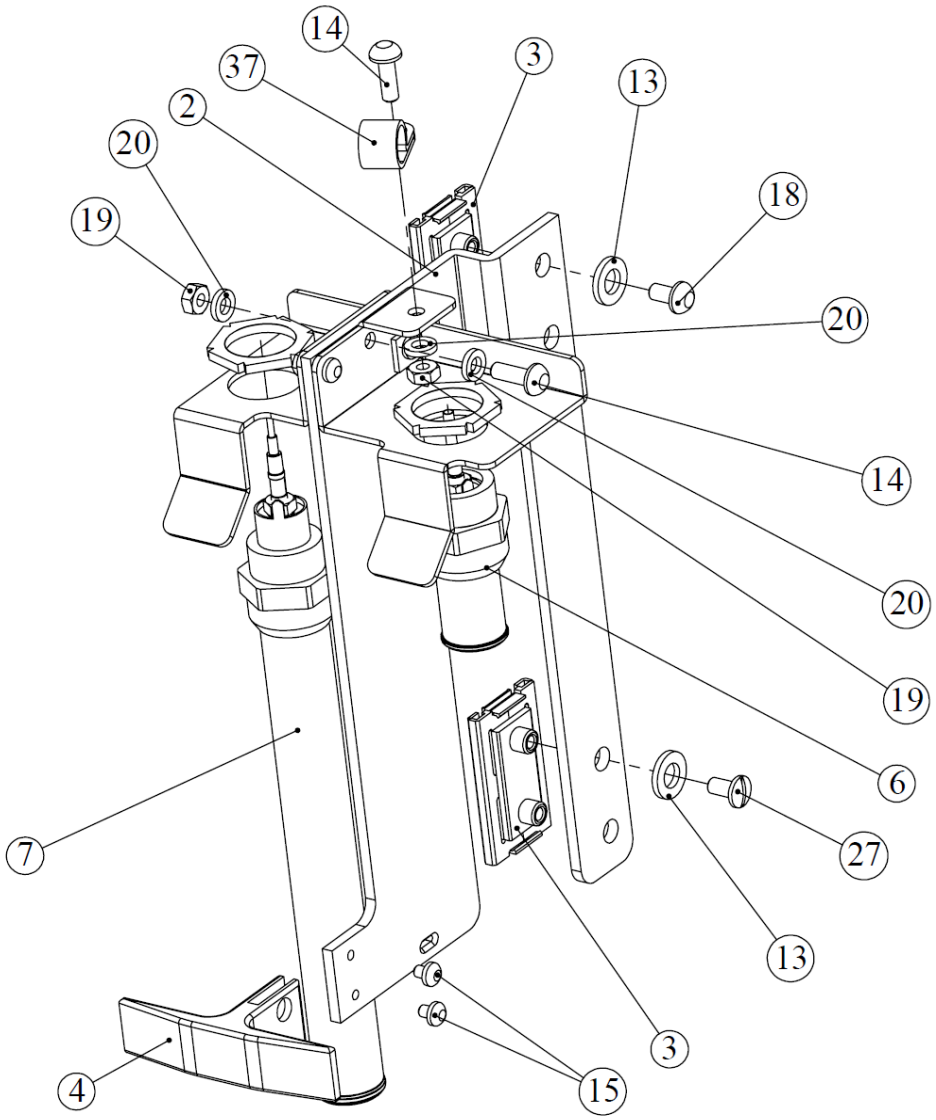
Position	CMA P/N	Description	Qty
1	8001824	Detector housing	1
2	8001808	LED module	1
3	8001804	Photo diode module	1
4	8001870	PCB CMA Heat	1
5	8001827	Sensor cover	1
6	75403005	Screw MRT 3x5 A4	4
7	8001829	Spacer DRN 3160x3	4
8	75403010	Screw MRT 3x10 A4	4
10	8002270	Cable LED module	1
11	8002269	Cable Photo diode module	1
12	8002175	Sticker Class 1M LED	1
14	8001946	Peek holder	1
15	8001945	Peek bracket	1
16	8001973	Screw MRT M3x6	8
17	8003313	Washer FBB 3,1	8
18	75140320	3,2Washer AZ lock	4

8003203 Rinse / Waste Module

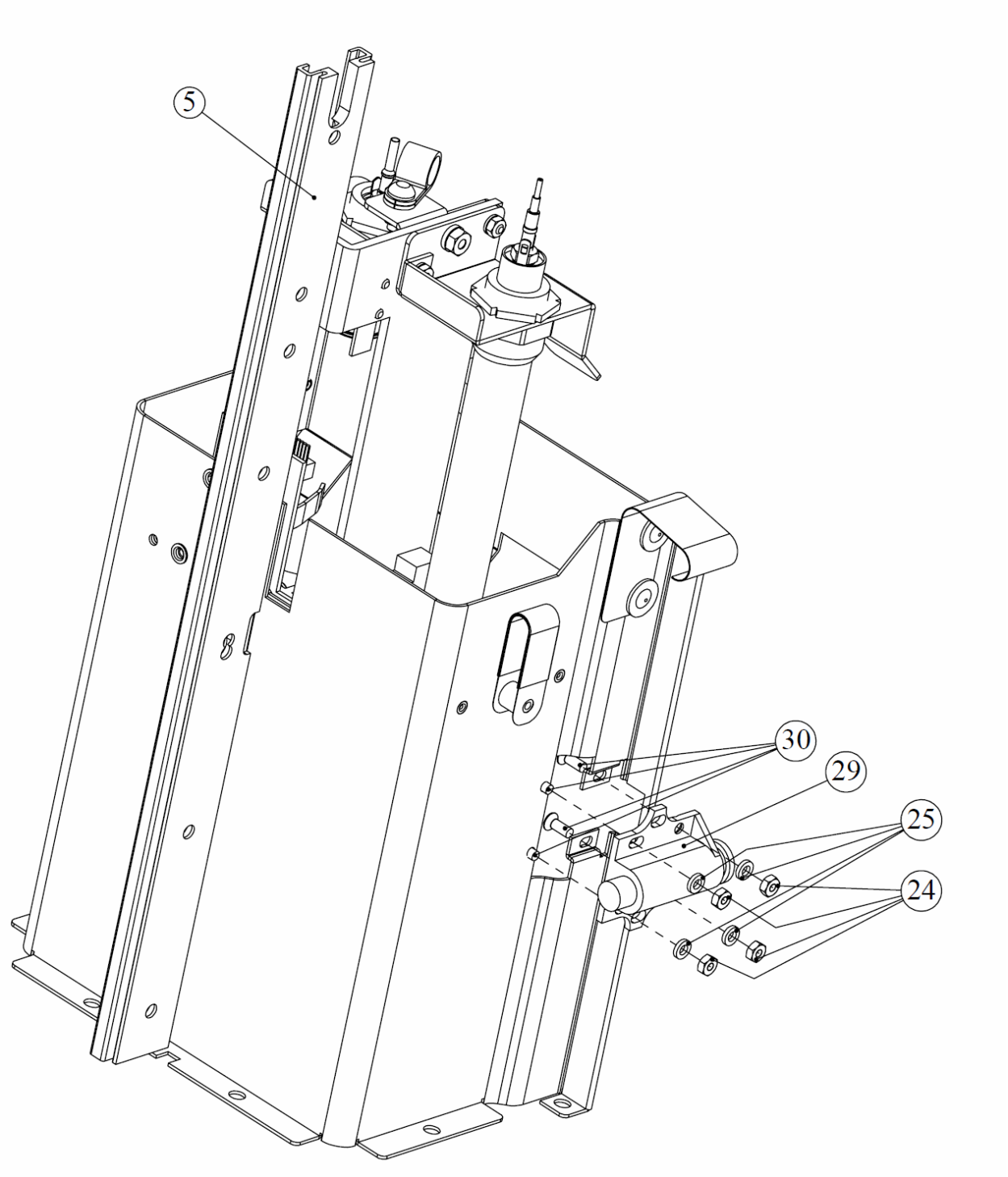




8003203 Rinse / Waste level sensors



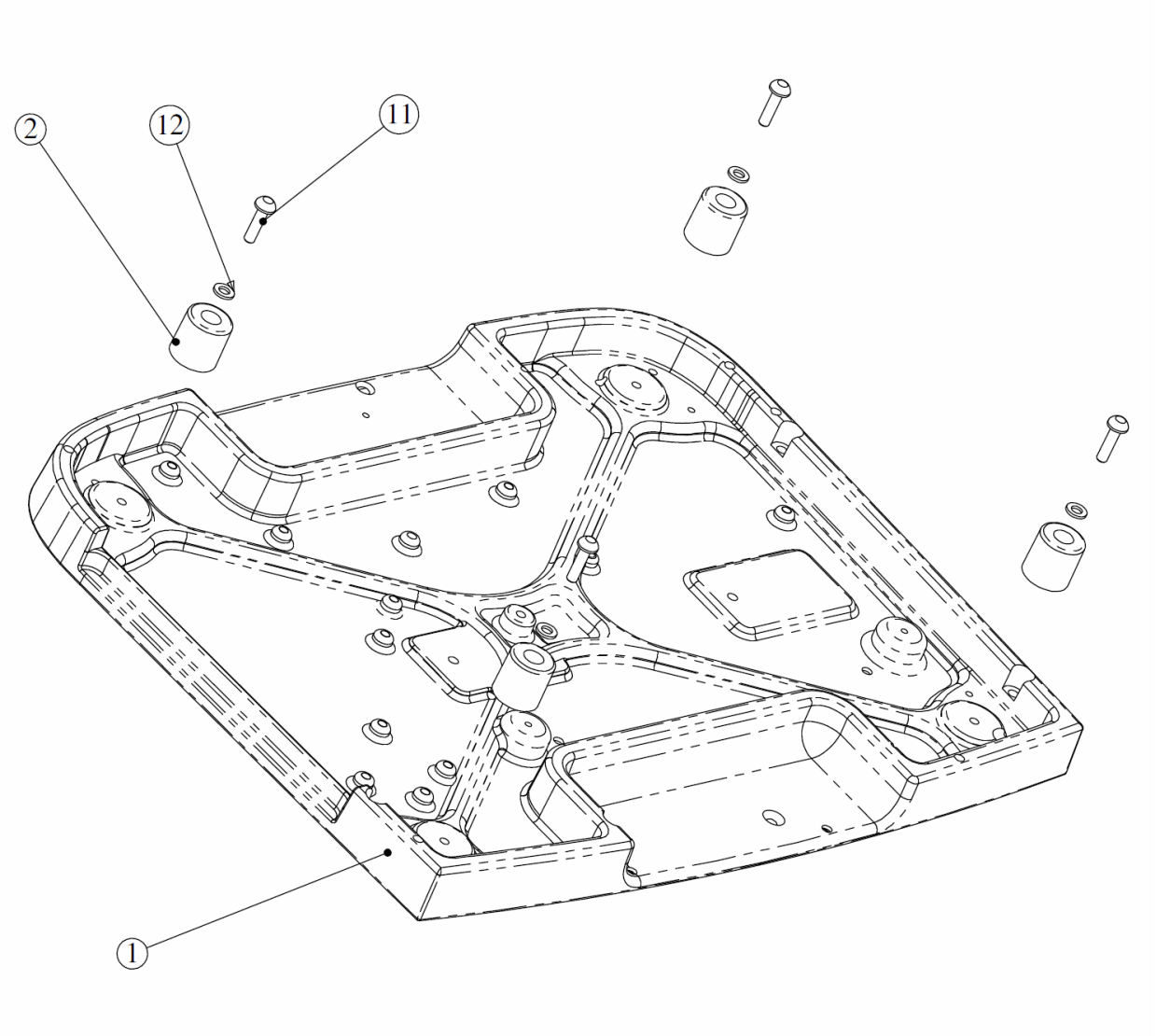
8003203 Rinse /Waste Module



8003203 Rinse / Waste Module parts list

Position	CMA P/N	Description	Qty
1	8003150	Rinse bottle housing	1
2	8002185	Holder for the bottle sensors compl	1
3	8001848	Slide bearing	2
4	8002188	Handle	1
5	8001965	Rail for slide bearings	1
6	8003156	Waste tube complete	1
7	8003161	Rinse tube complete	1
8	8003152	PBA ISCUS Flex sensor compl.	1
9	8002199	Flag Screw	1
10	8003154	Guide left	1
11	8003155	Guide right	1
12	8001813	Screw MRT 3x8 A4	6
13	8002401	Washer BRB 6,4x12x1,6 A4	2
14	8001475	Screw MRT 4x12 A2	2
15	8001929	Screw MRT 3x4 A2	2
16	8002345	Sticker Rinse	1
17	8002346	Sticker Waste	1
18	8001831	Screw MRT 4x8 A4	1
19	75200400	Nut M6M M4 A4	2
20	75140430	Washer AZ 4,3 A4	3
21	8002449	Spacer	1
22	75063006	Screw SK6SS 3x6 A4	1
23	8003859	Spacer M3x 8 A2	1
24	75200300	Nut M6M M4	5
25	75140320	Washer AZ 3,2 A4	5
26	8002800	No longer in use	1
27	8002522	Screw LKCS M4x8	1
28	8003151	Waste flag arm complete	1
29	8003146	Magnetic lock	1
30	8002390	Screw MFT M3x8	4
31	8003313	Washer FBB 3,1	7
32	8002404	Spring 0,4x4x15	1
33	75003008	Screw MCS M3x8	4
34	M000309	Soldering eye M3	1
35	75210300	Nut ML6M M3	1
36	8003313	Washer FBB 3,1	1
37	8002544	Cable clip ID 9	2

8003399 Chassie



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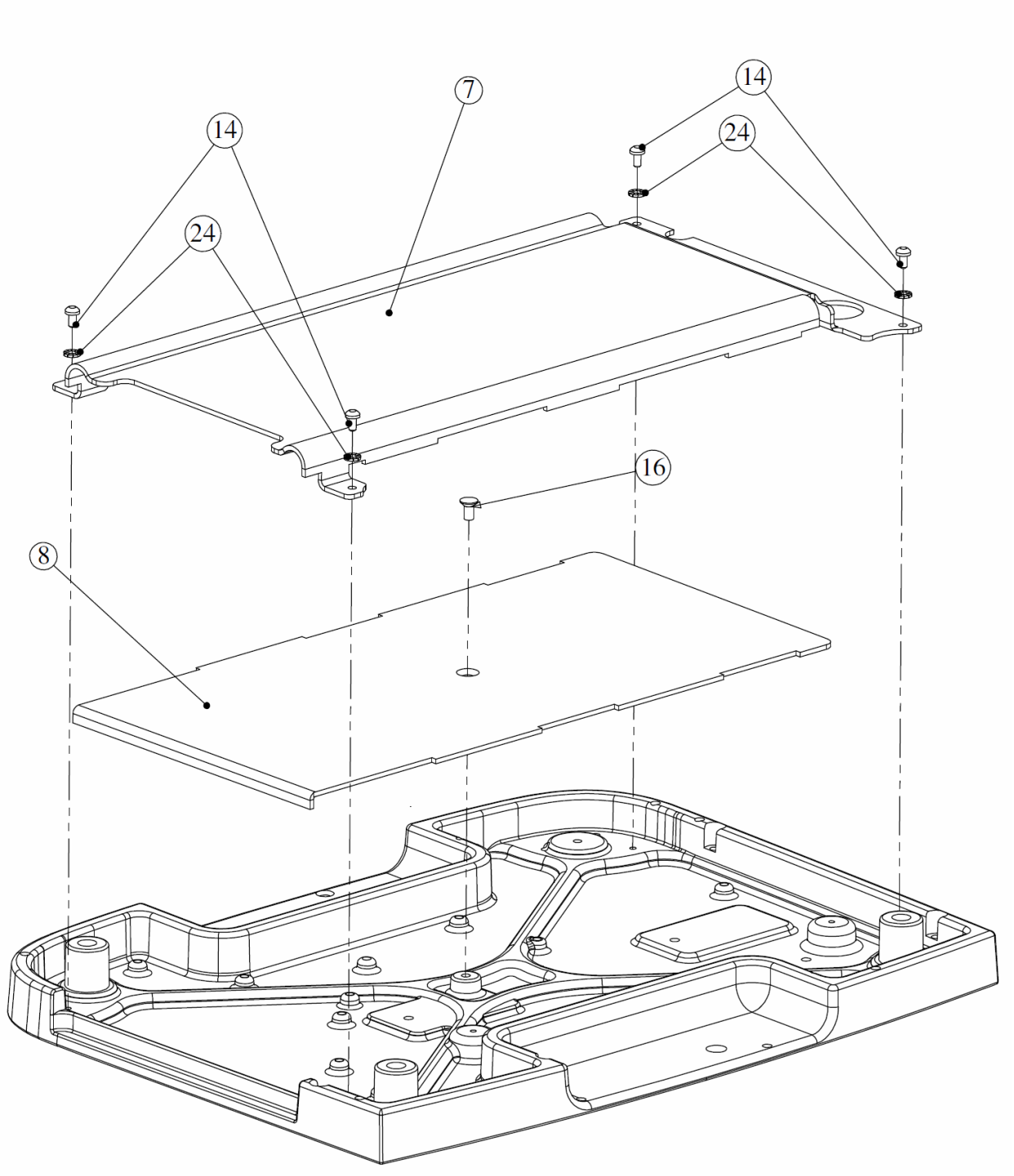

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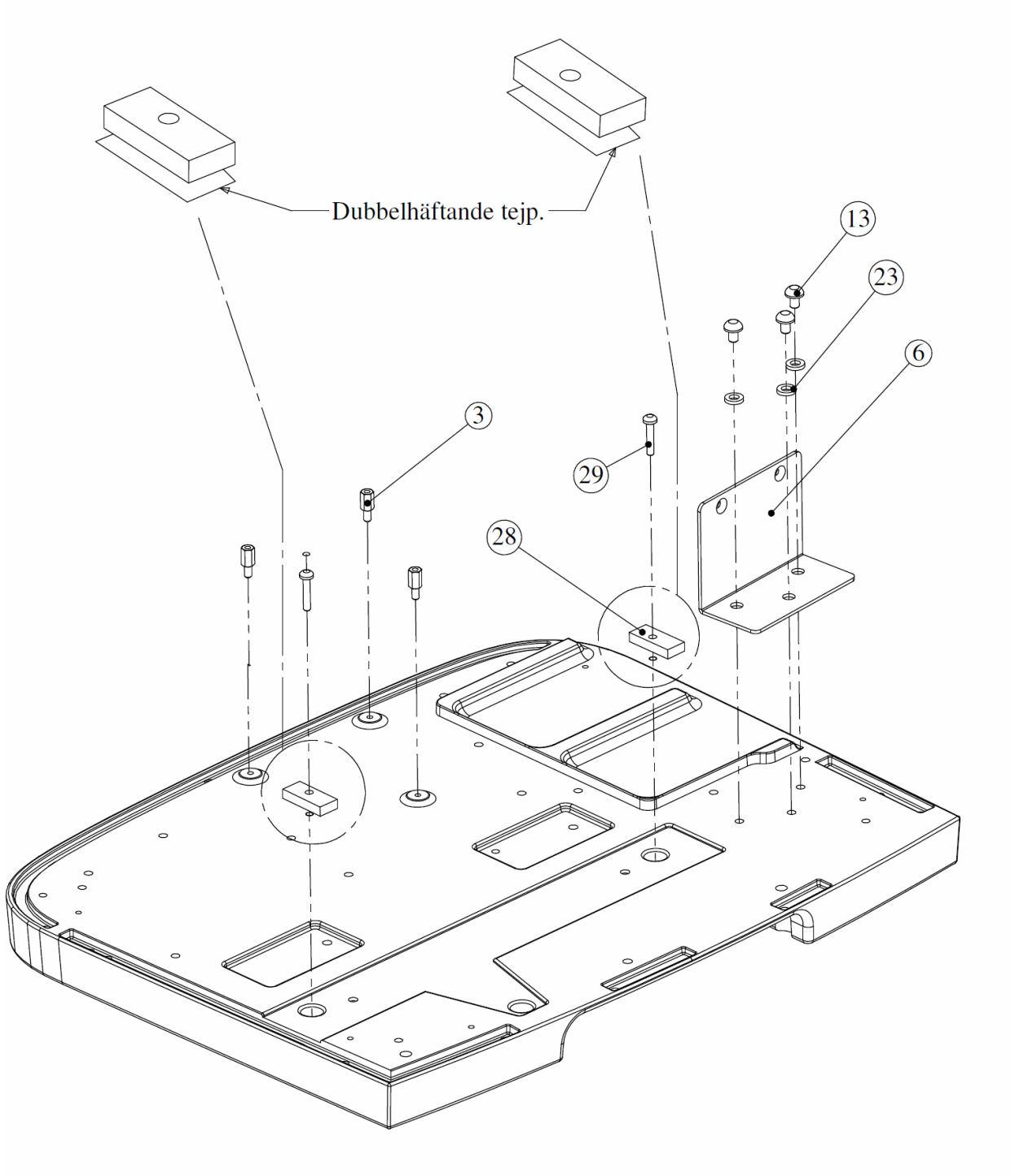

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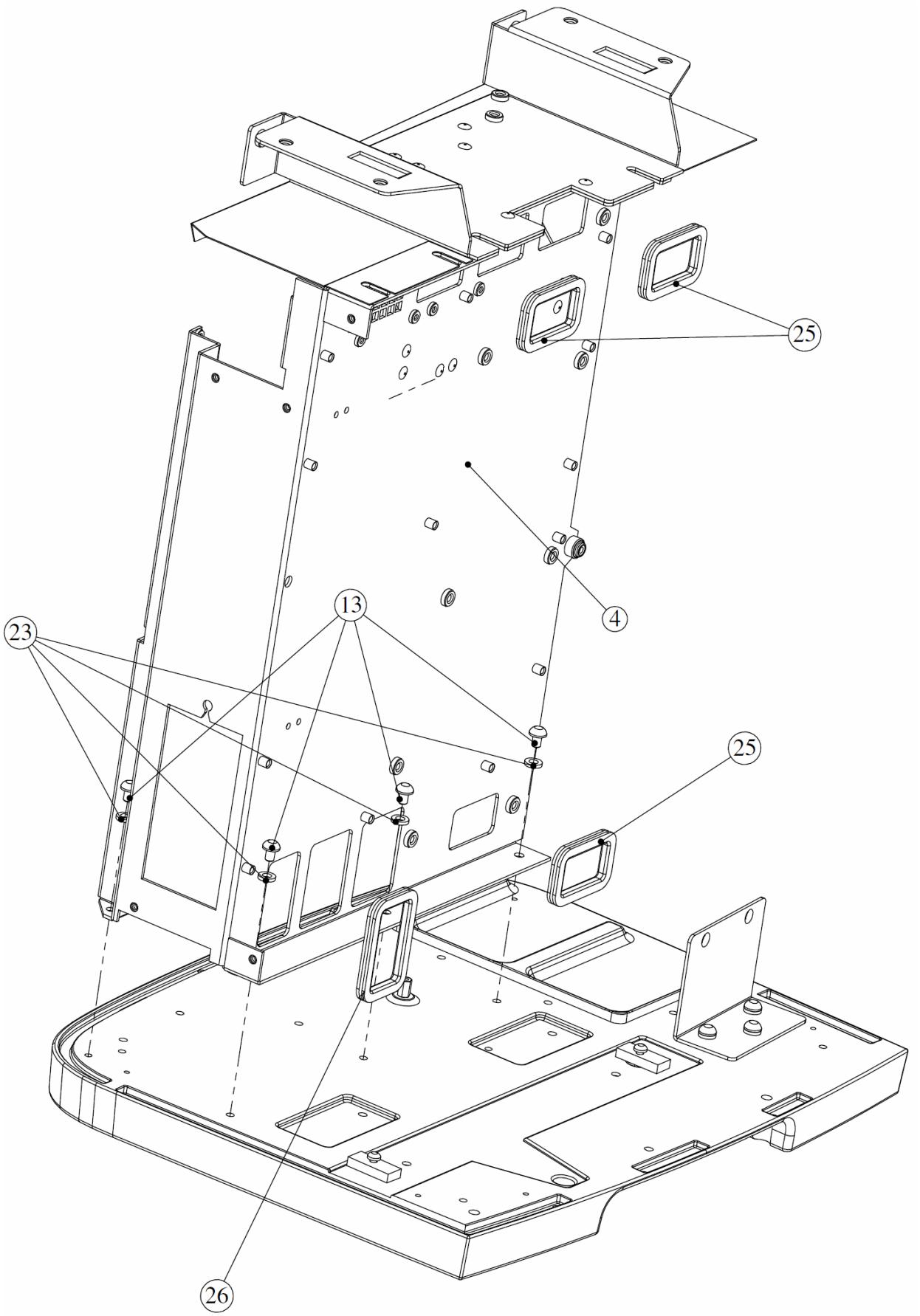

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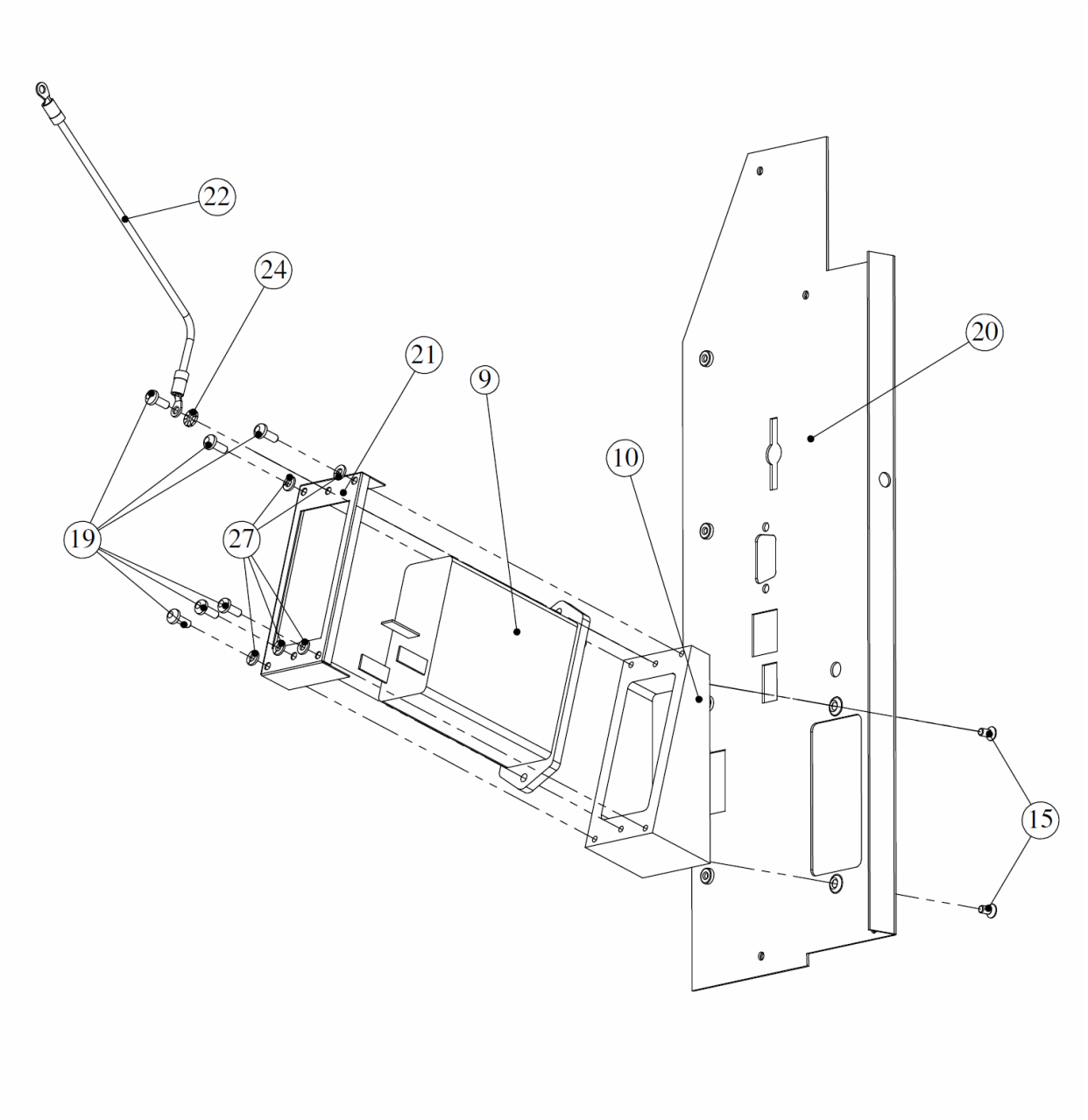

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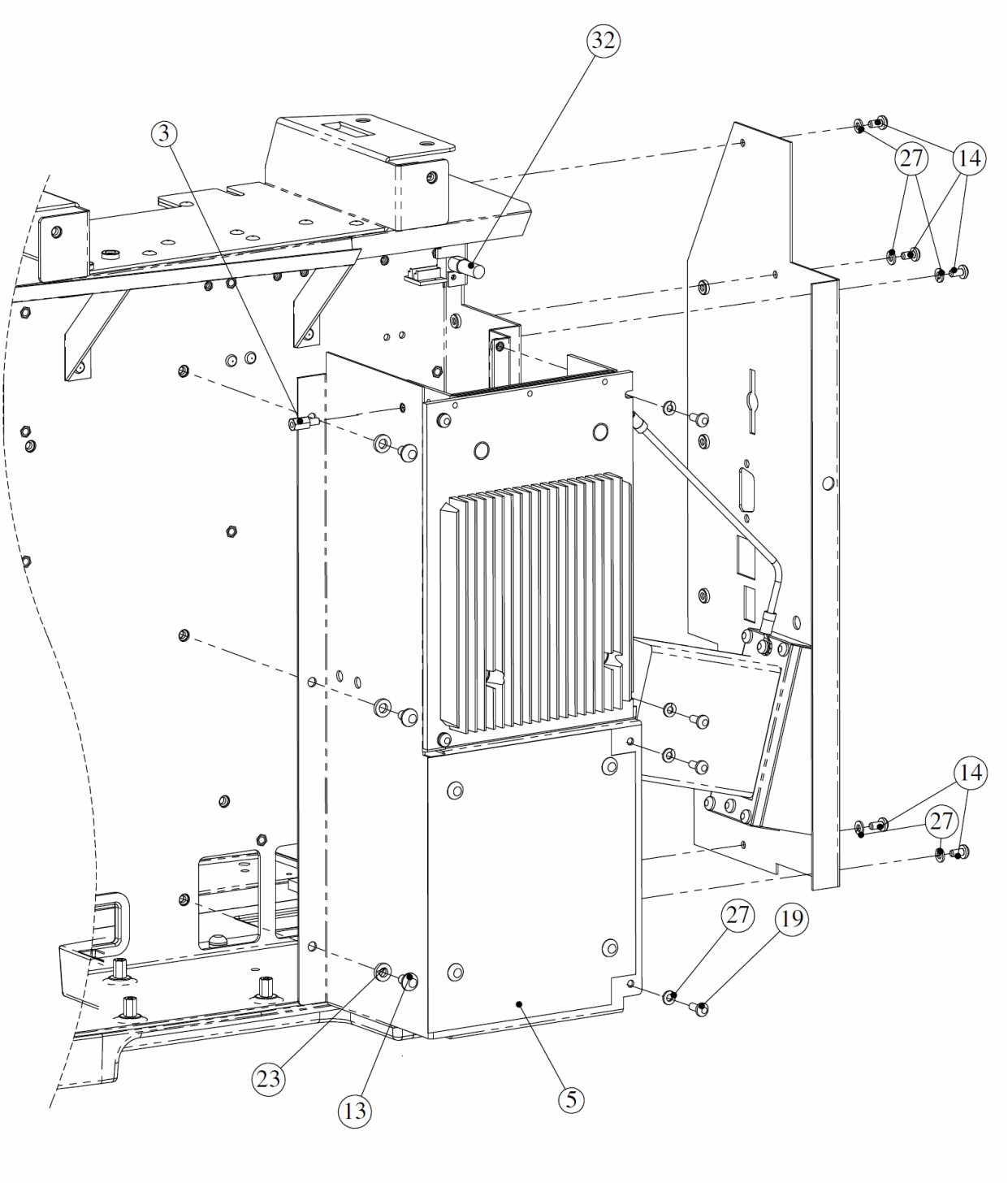

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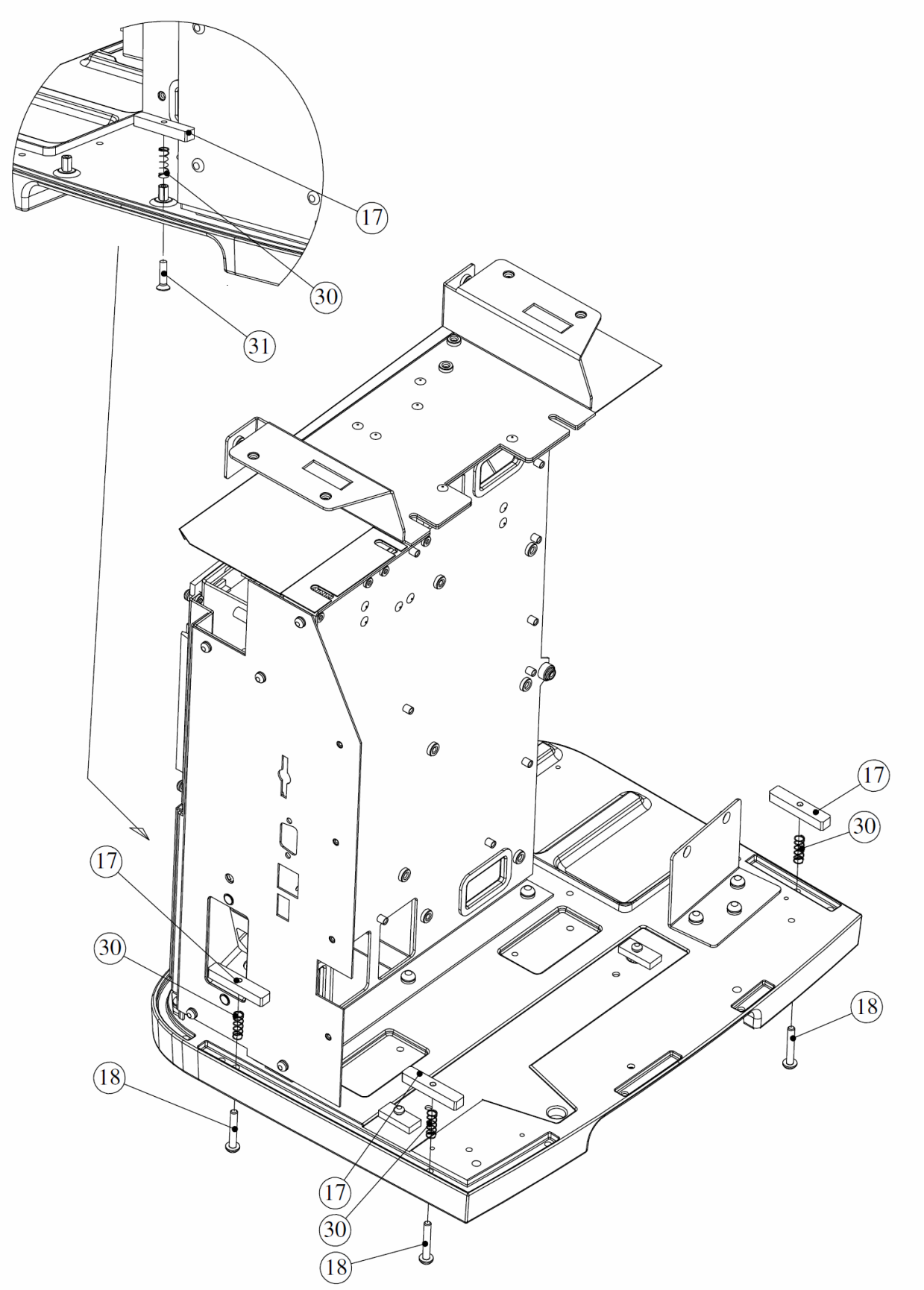
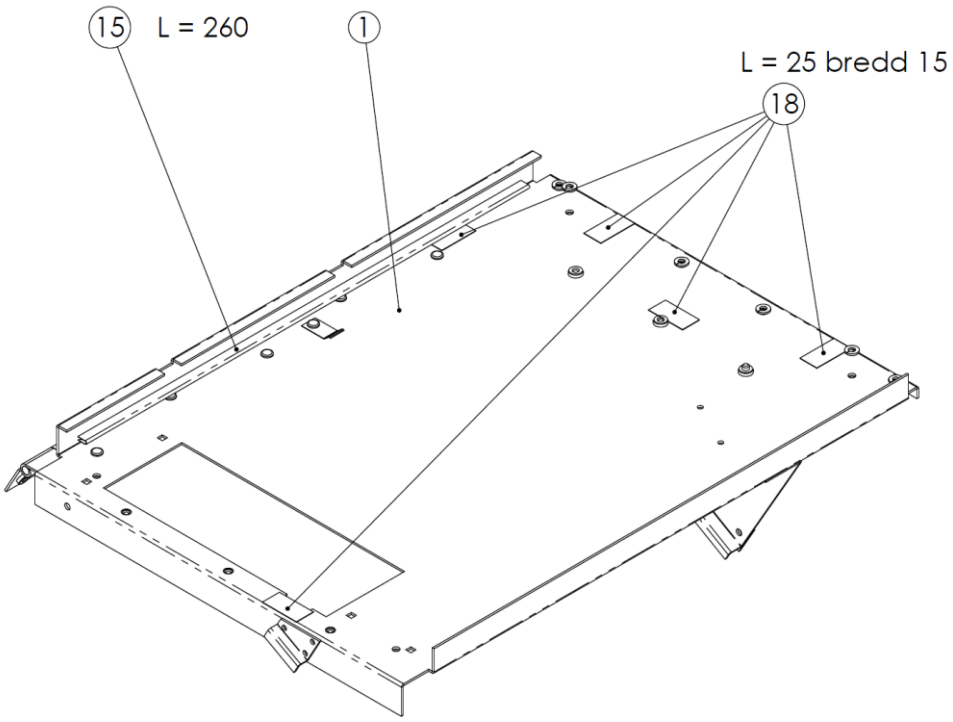


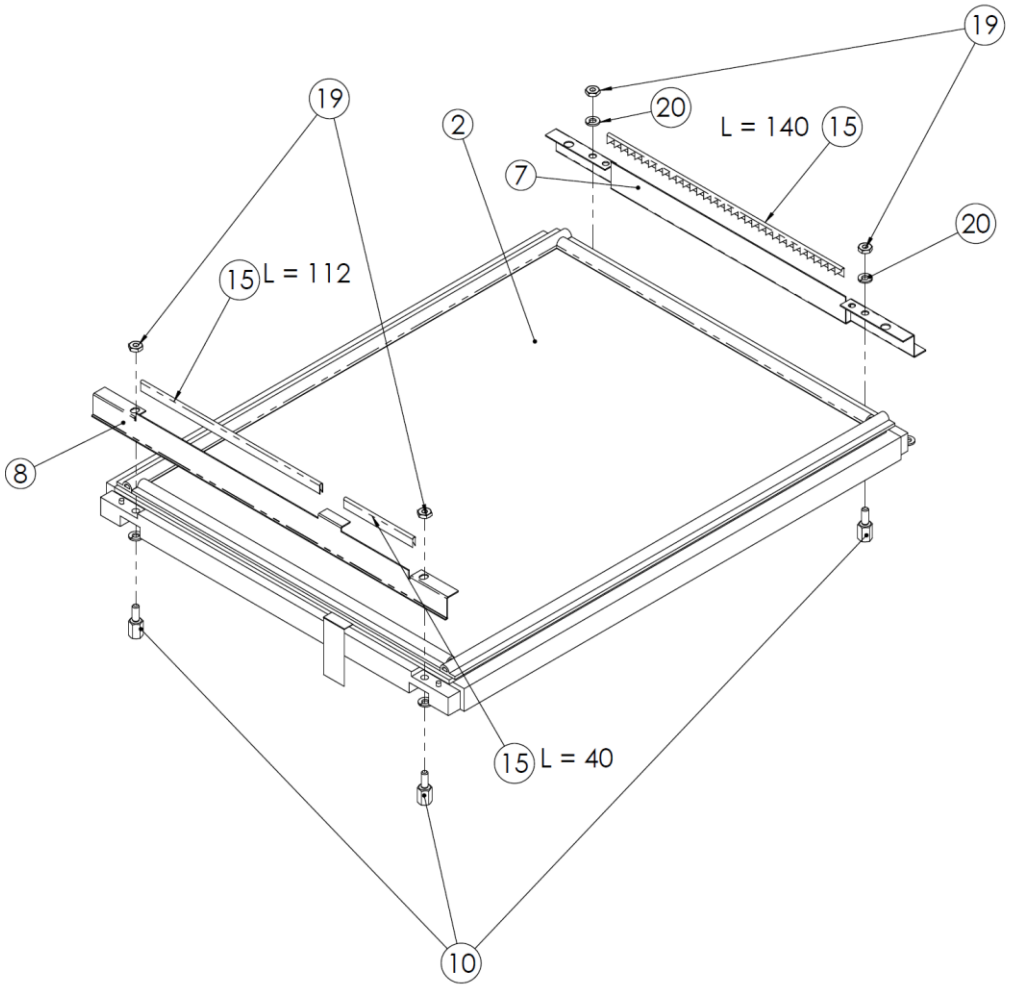
8003399 Chassie Parts List

Position	CMA P/N	Description	Qty
1	8001934	Chassis Bottom	1
2	8002182	Foot	4
3	8003859	Spacer M3x8	4
4	8002661	Inner Chassis	1
5	8002680	Fan Module	1
6	8002254	Printer mounting plate	1
7	8001951	Holder for manual upper	1
8	8001952	Holder for manual lower	1
9	8002605	Mains 100-240 V	1
10	8002405	Cover	1
11	8002402	MRT M4 x 16 A4	4
12	8001474	Washer BRB 4,3x8x0,8 A4	4
13	8002438	MRT M4x6 A4	10
14	8001973	MRT M3x6 A4	9
15	8002300	MFT M3x6 A4	2
16	8002436	MFT M4x8 A4	1
17	8002616	Fastener for cover	4
18	75404025	MRT M4x25 A4	3
19	8001835	MRT M3x8 A4	10
20	8002791	Panel	1
21	8002755	Cover	1
22	8002805	Ground connection wire	1
23	75140430	Washer AZ 4,3 A4	10
24	75140320	Washer AZ 3,2 A4	5
25	8002698	Cable grommet	3
26	8002699	Cable grommet	1
27	8003313	Washer FBB 3,1 A4	14
28	8003647	Spacer	2
29	8001479	MRT M3x16	2
30	8003410	Spring	4
31	8002617	MTF M4x16 A4	1
32	8002674	PCA ISCUS Pot CB	1

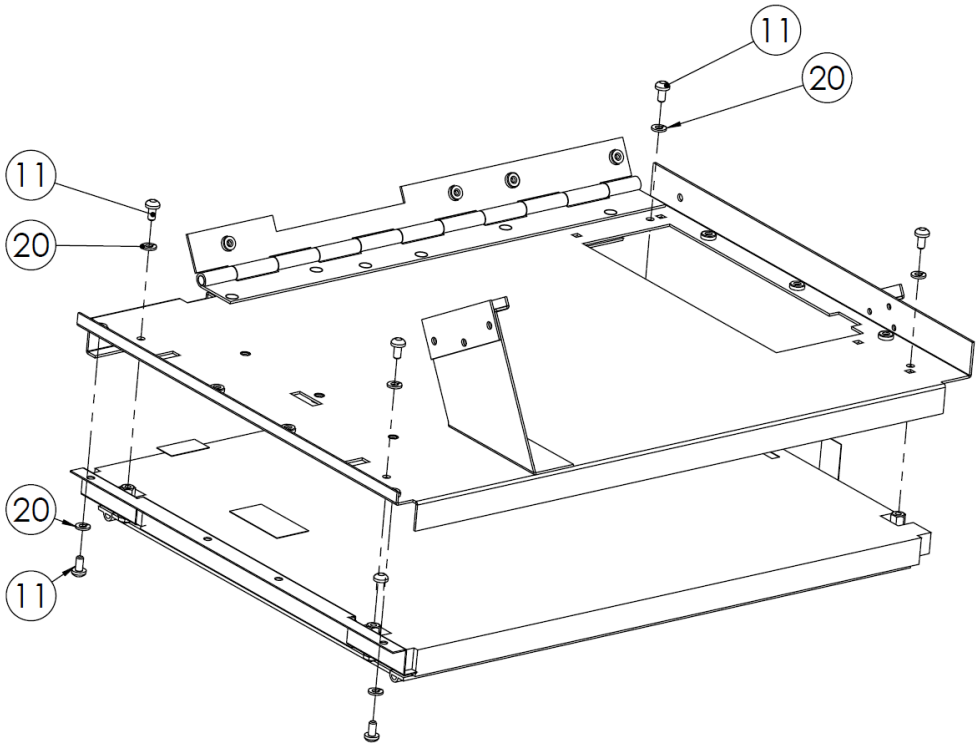
8002630 LCD Monitor

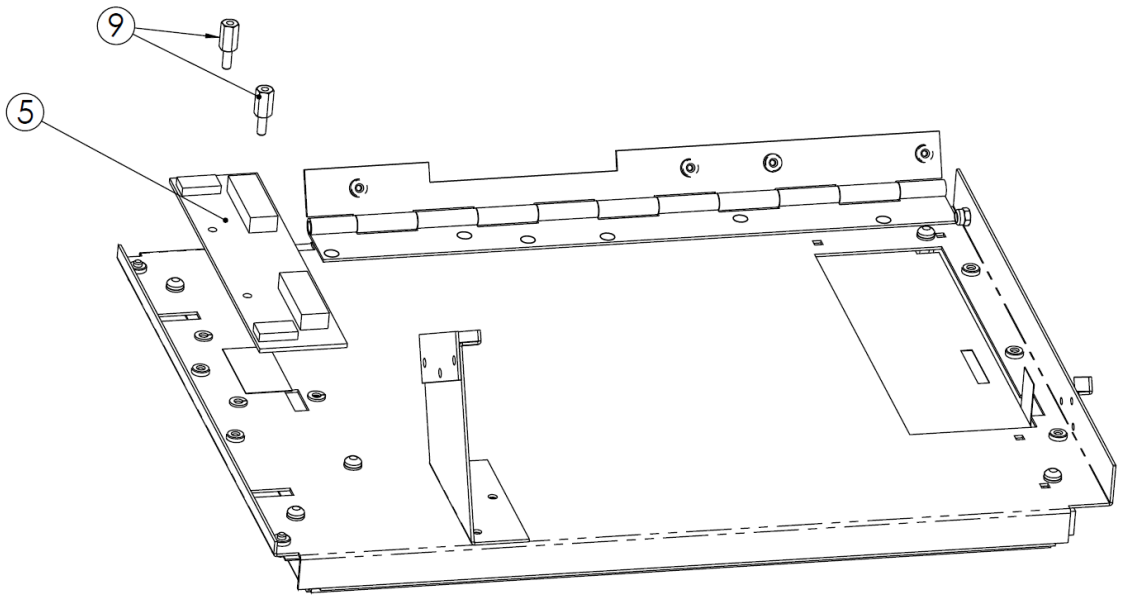


8002630 LCD Monitor

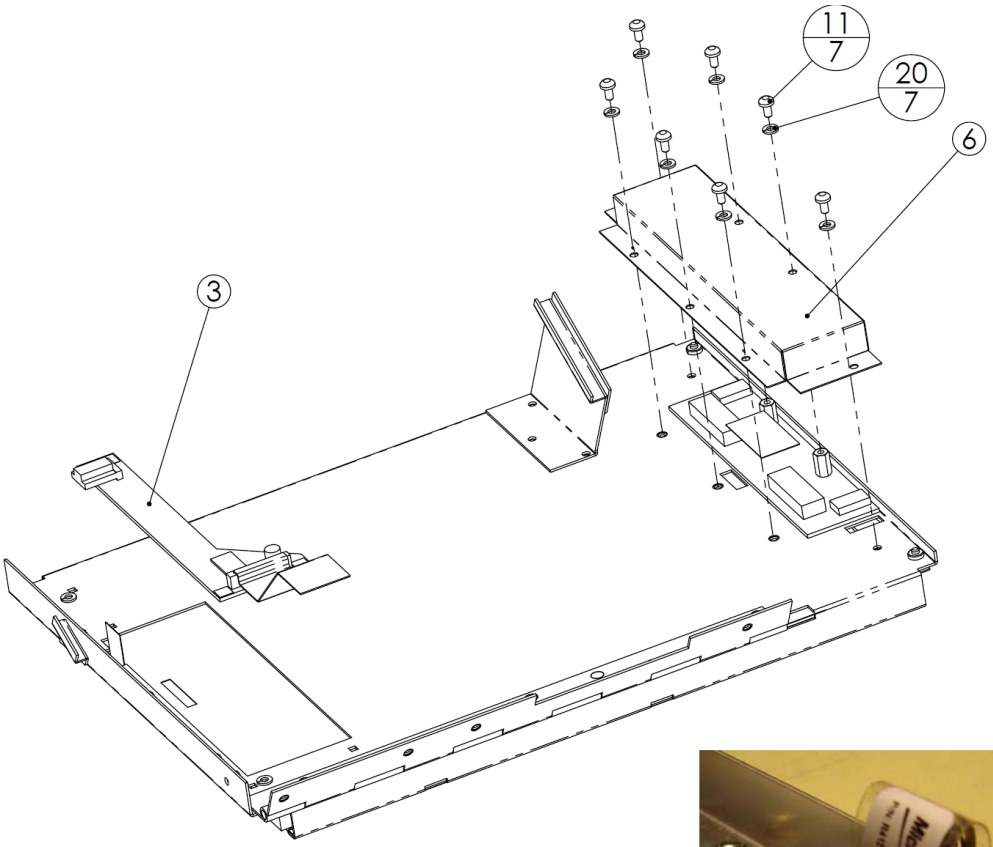


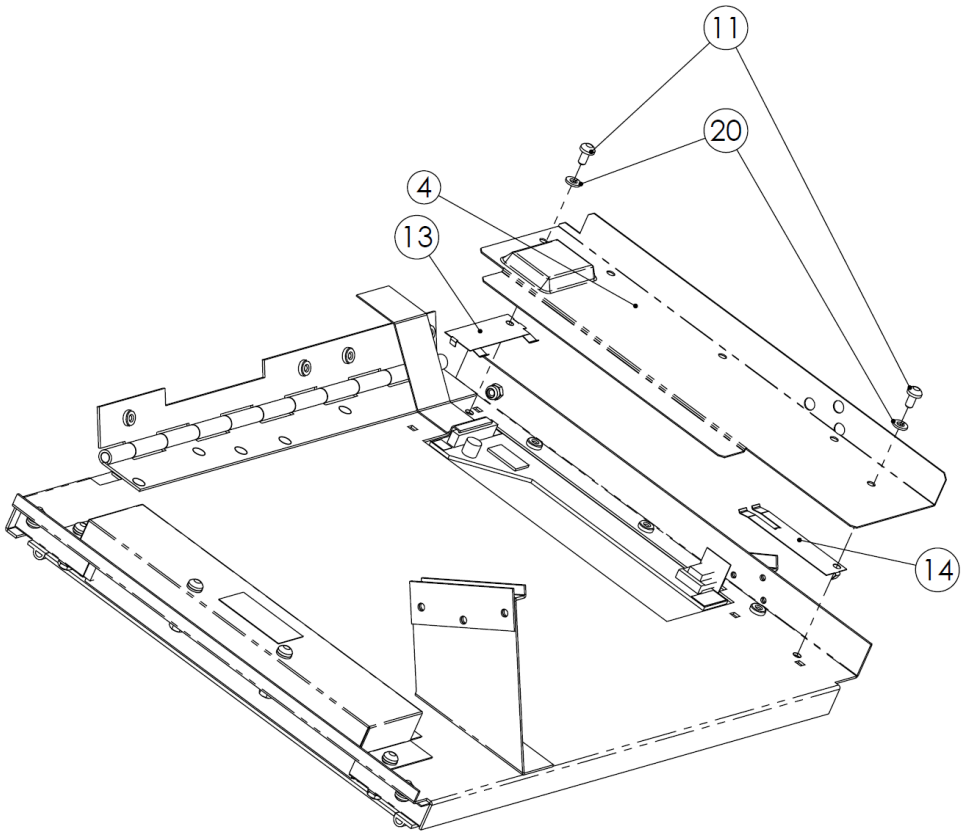
8002630 LCD Monitor



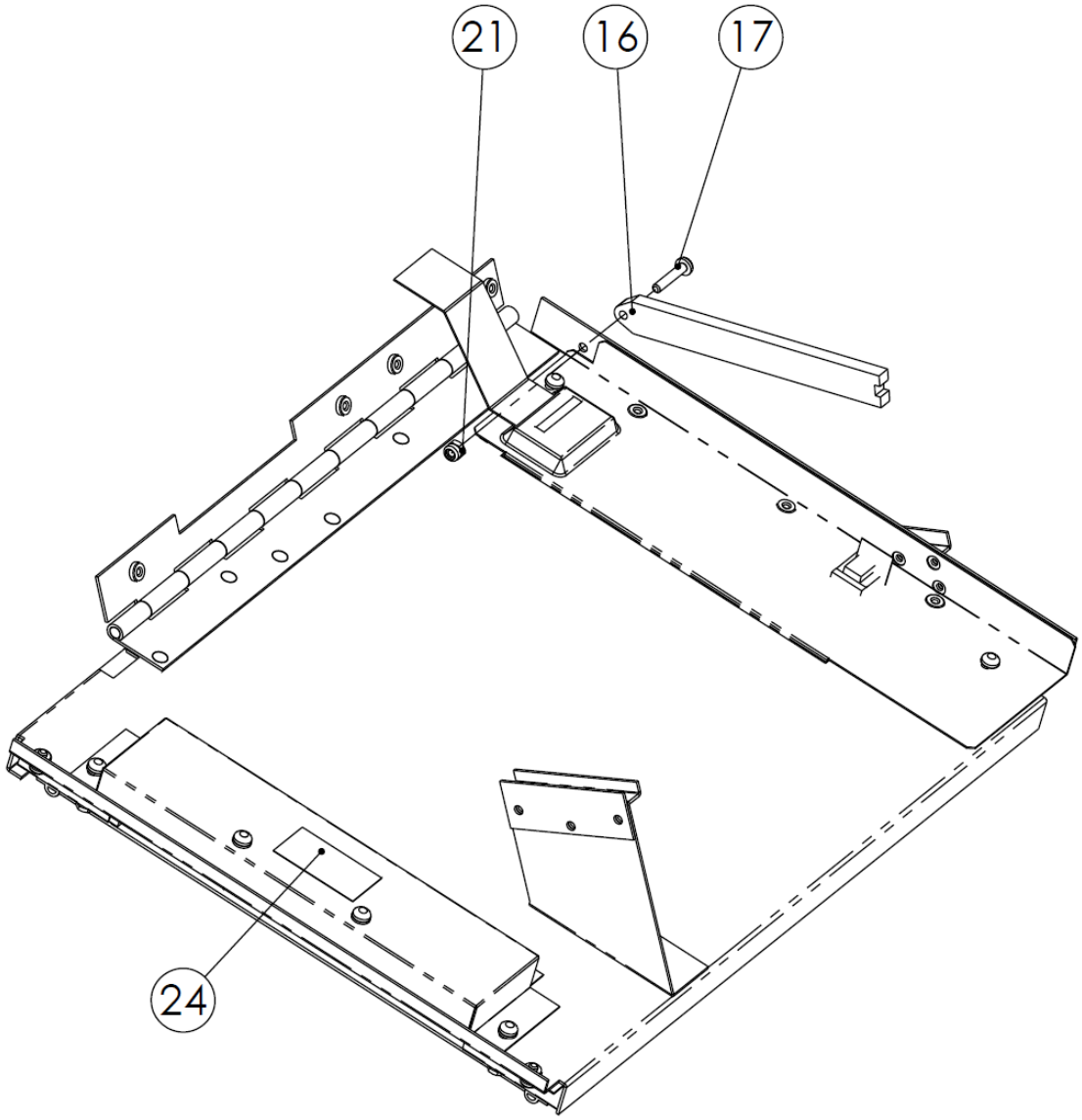


8002630 LCD Monitor





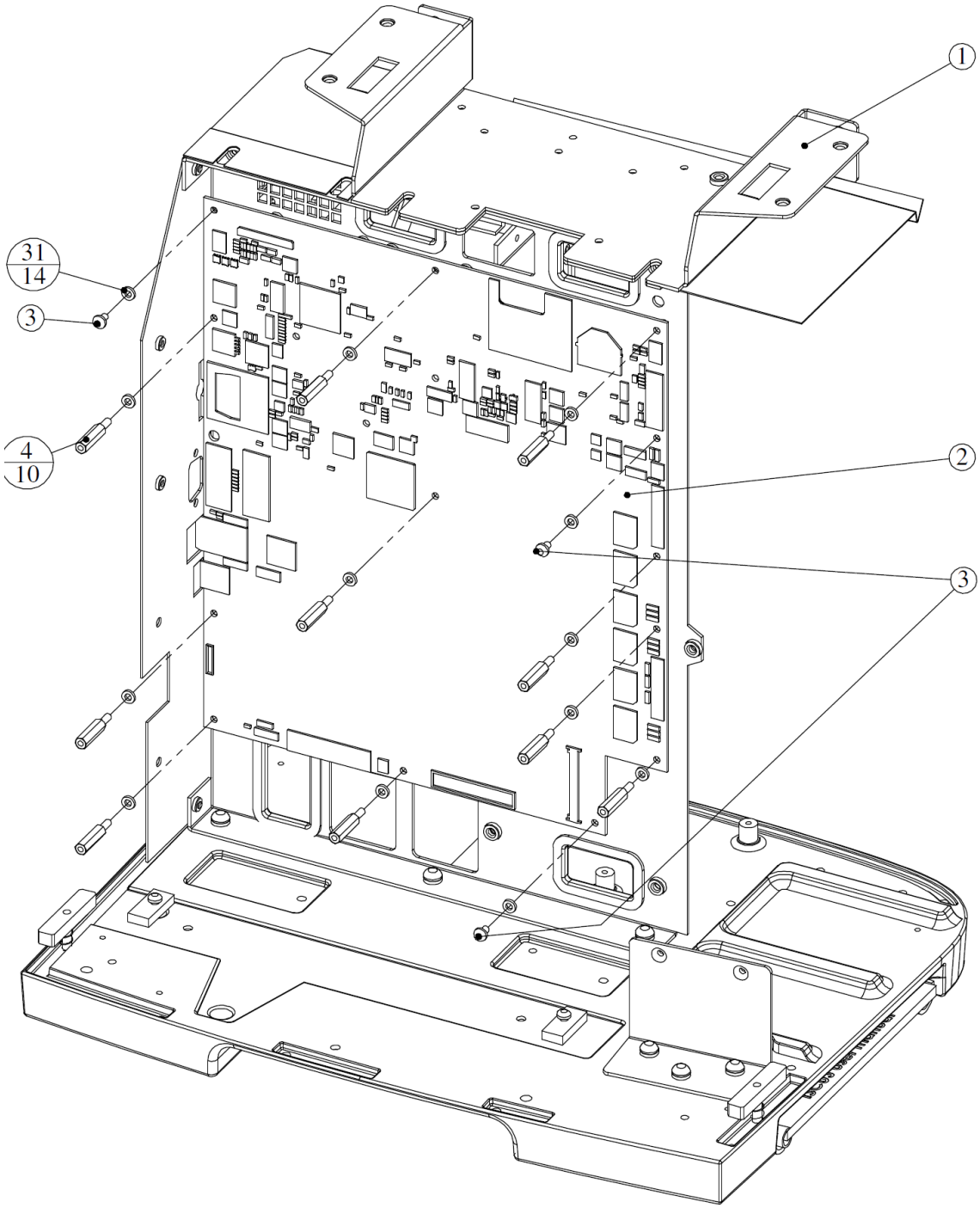
8002630 LCD Monitor



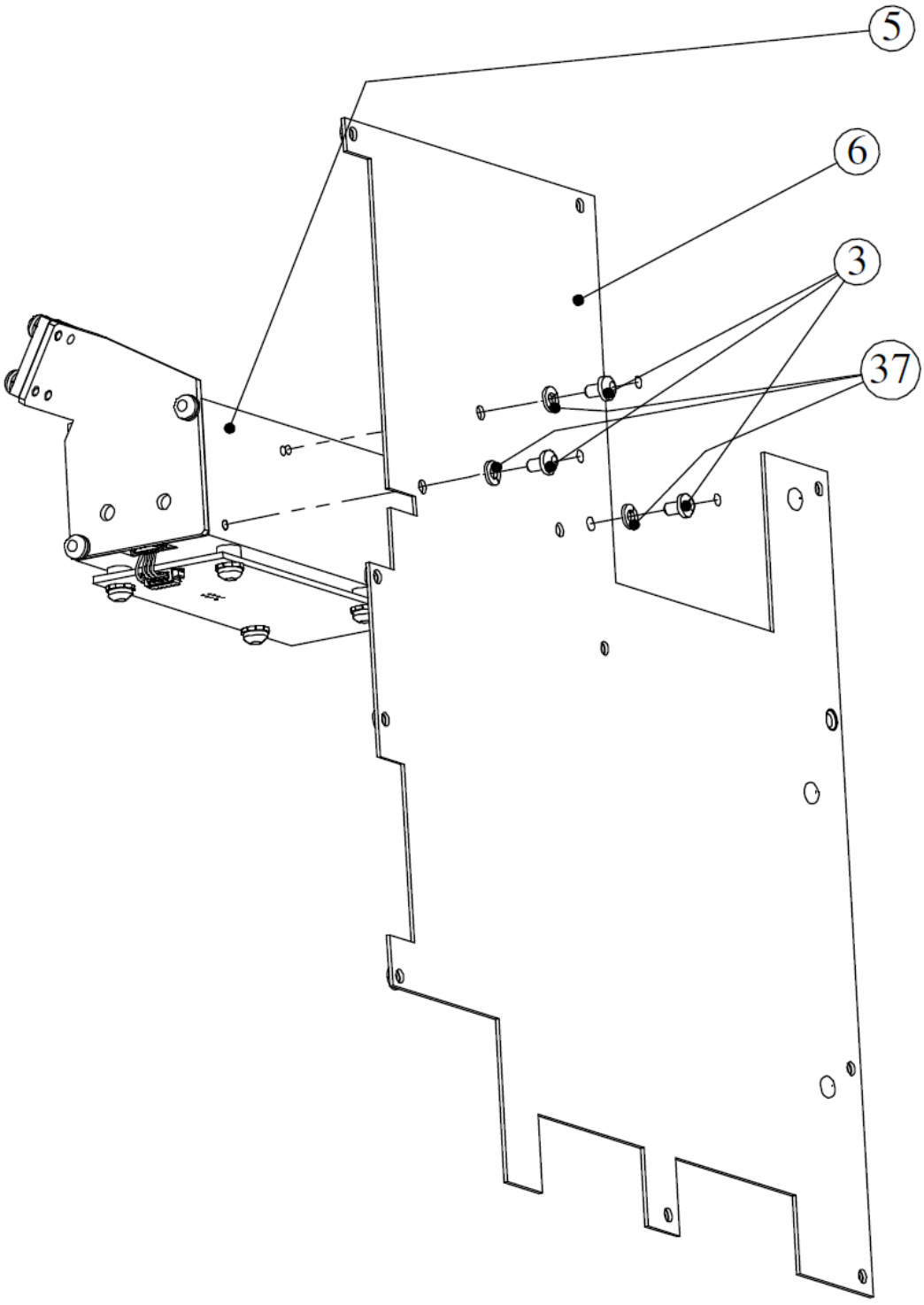
8002630 LCD Monitor Module Parts List

Position	*CMA P/N*	*Description*	*Qty*
1	8002633	LCD Chassis complete	1
2	8002230	LCD Display with Touch screen	1
3	8002603	PCB Display adapter New	1
4	8002637	Shield plate	1
5	8002338	PCB ISCUS Backlight unit	1
6	8002636	Cover	1
7	8002638	Mounting plate right	1
8	8002639	Mounting plate left Nut	1
9	8002443	Spacer screw M3055 x 10	2
10	8002916	Spacer screw M3050 x 8	4
11	8001973	Screw MRT M3 x 6 A4	15
12	75200300	Nut M6M M3 A4	2
13	8002784	Contact finger	1
14	8002782	Contact finger	1
15	8002801	EMC protection	3
16	8002647	Display support	2
17	8001479	Screw MRT 3 x 16 A4	1
18	7430522	Tape double adhesive	1
19	75210300	Nut ML6M M3 A4	4
20	8003313	Washer FBB 3,1 A4	19
21	75220300	Lock Nut M3	1
22	8002758	Cable ISCUS Backlight-Pot	1
23	8002781	Cable ICUS LCD	1

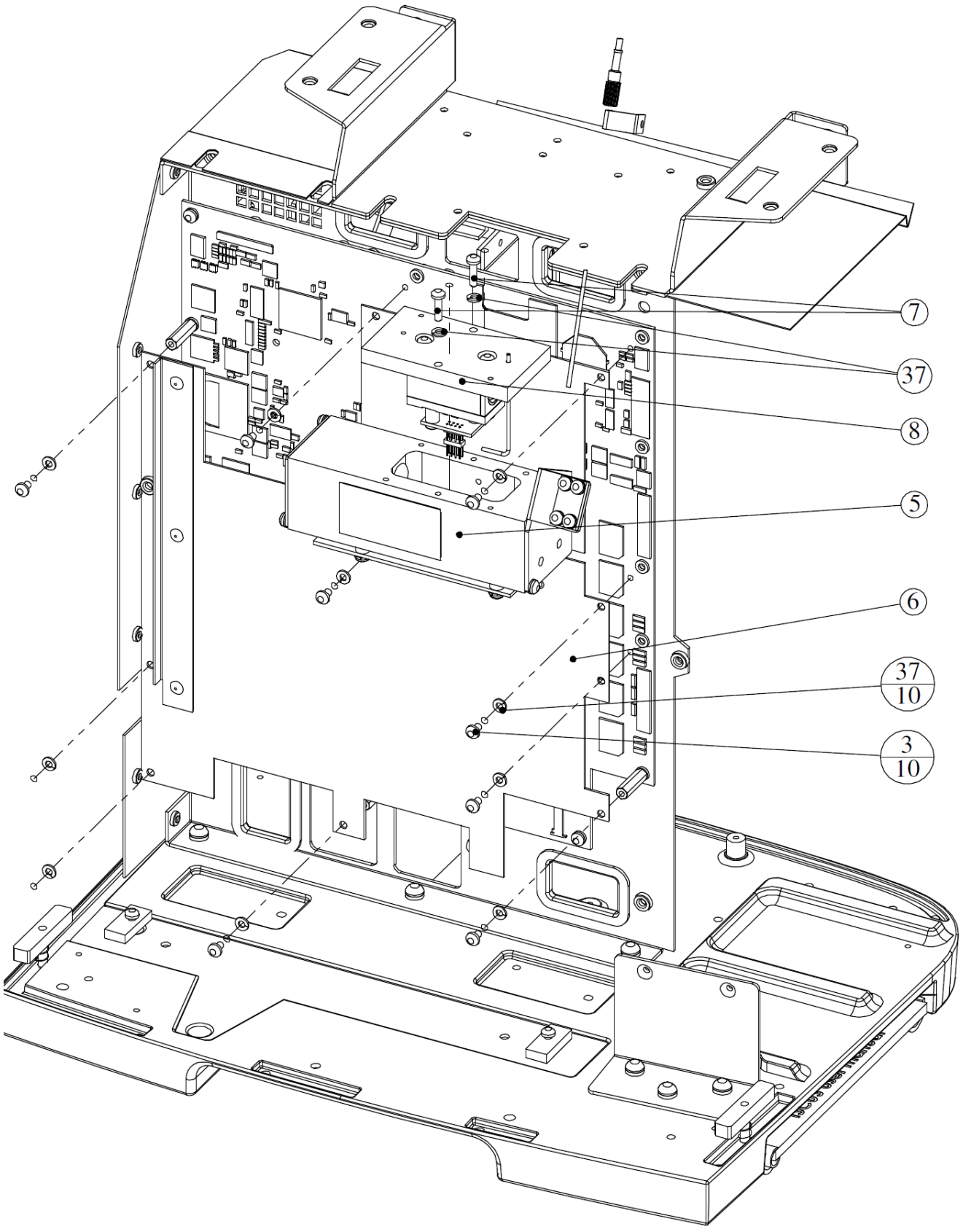
8003809 ISCUS Flex Analyzer



8003809 ISCUS Flex Analyzer



8003809 ISCUS Flex Analyzer



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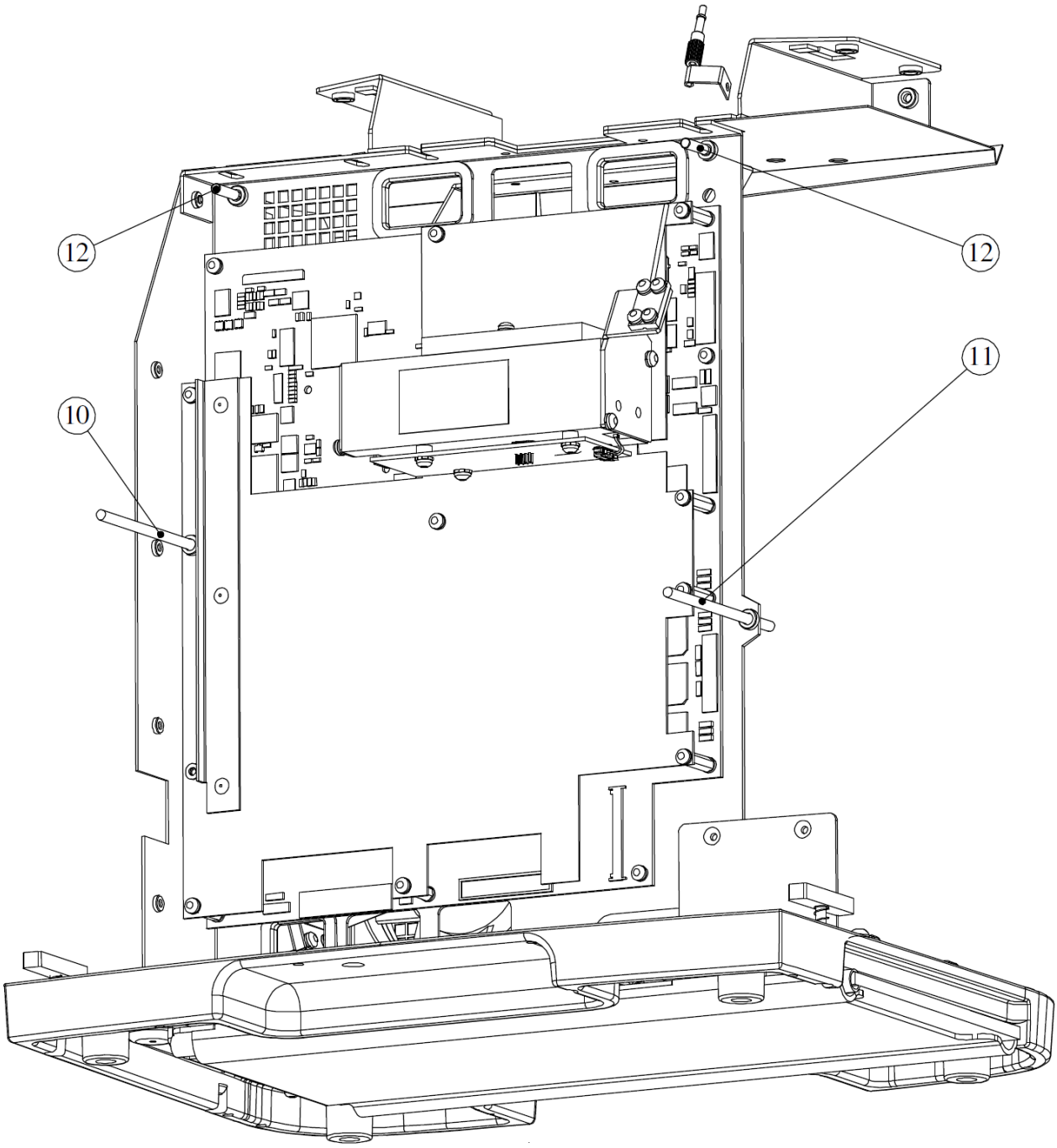

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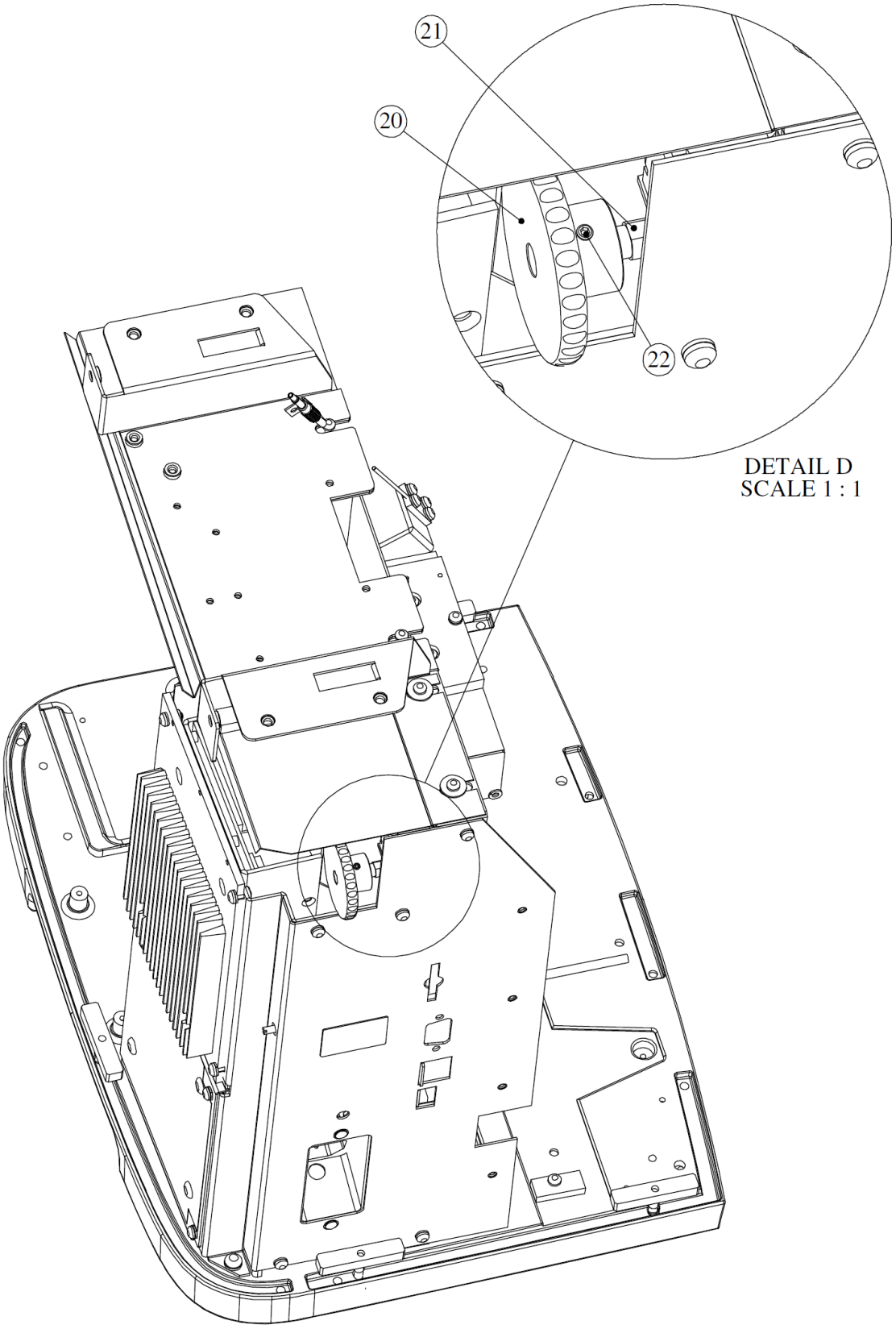

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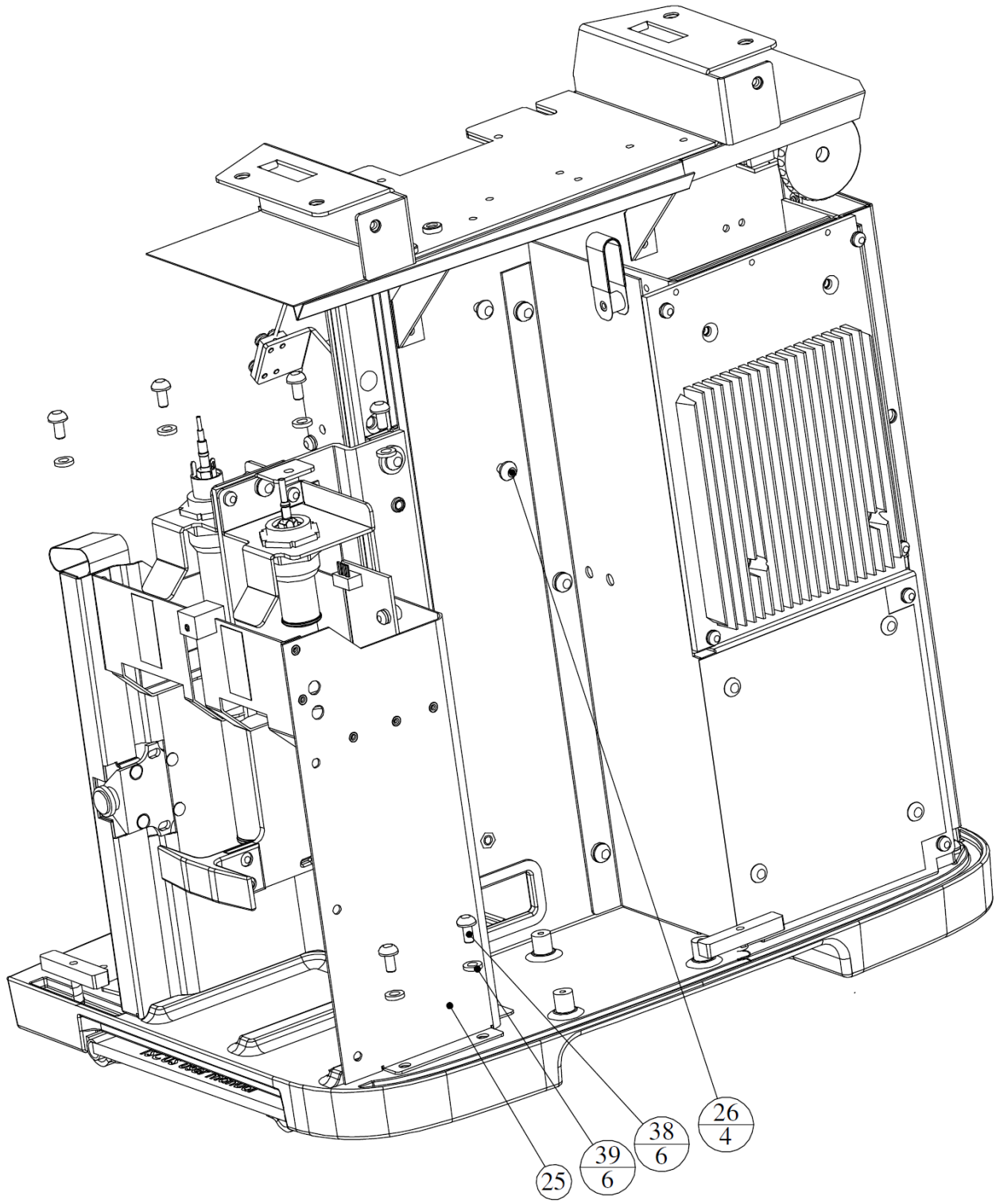

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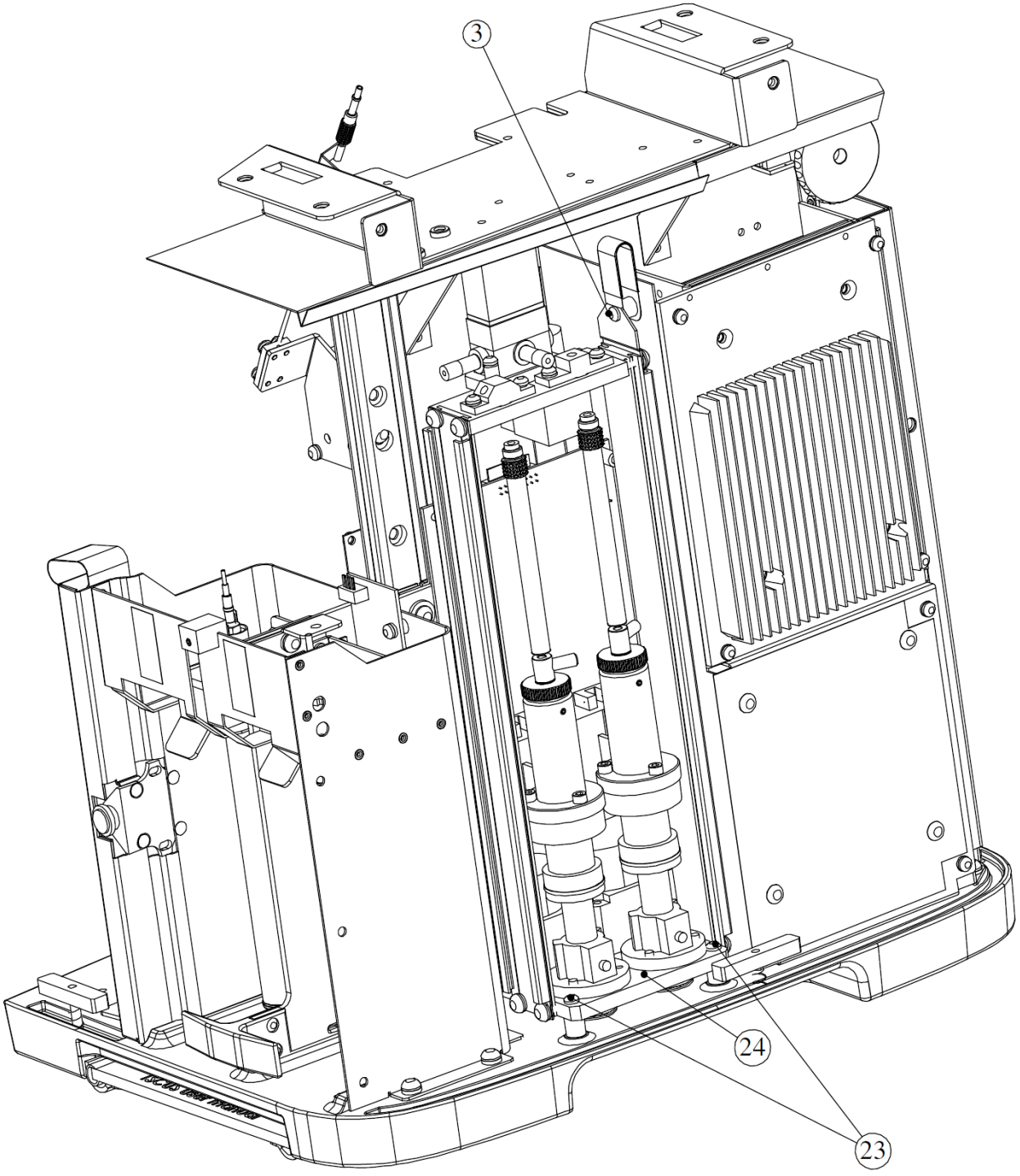

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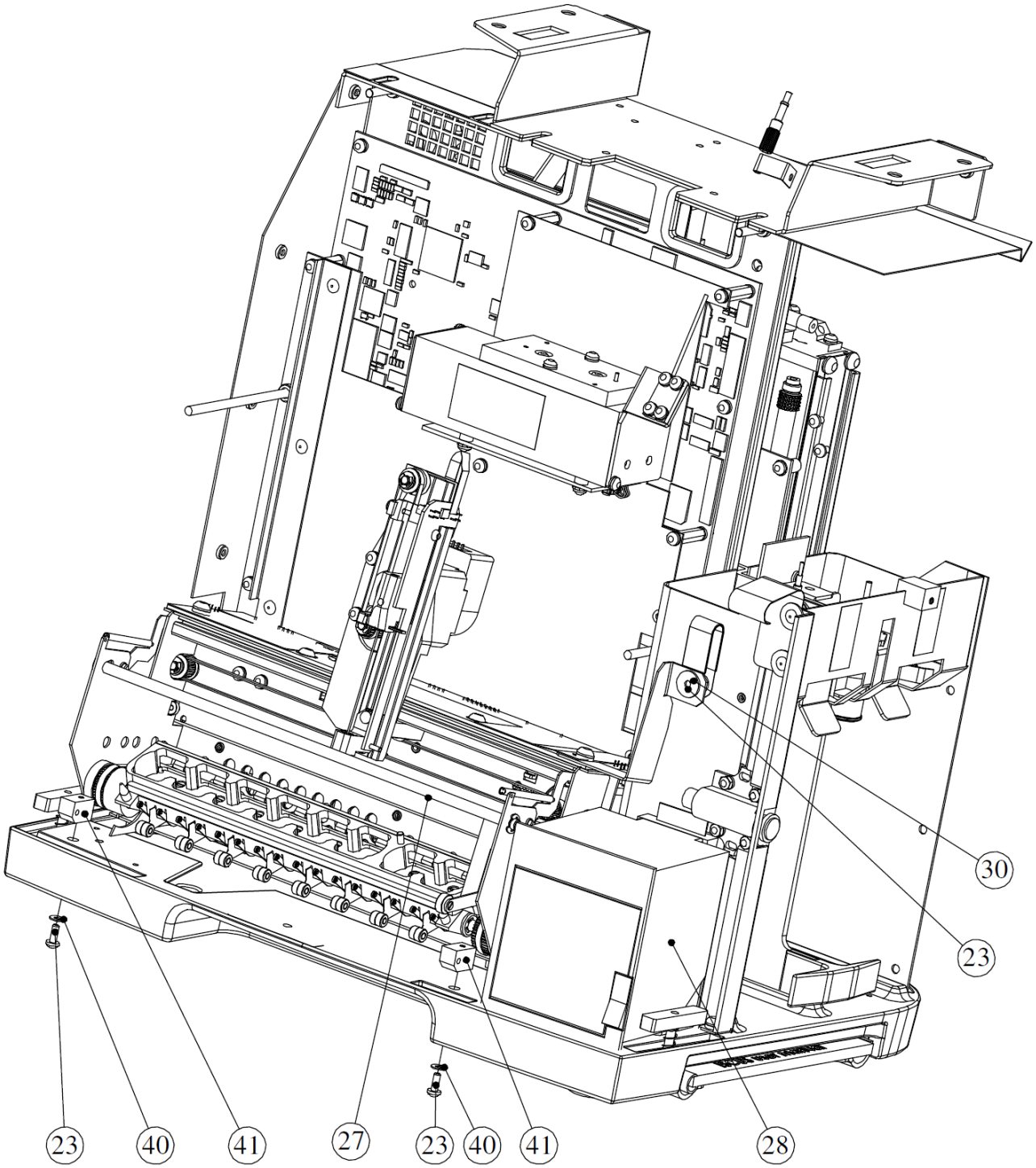

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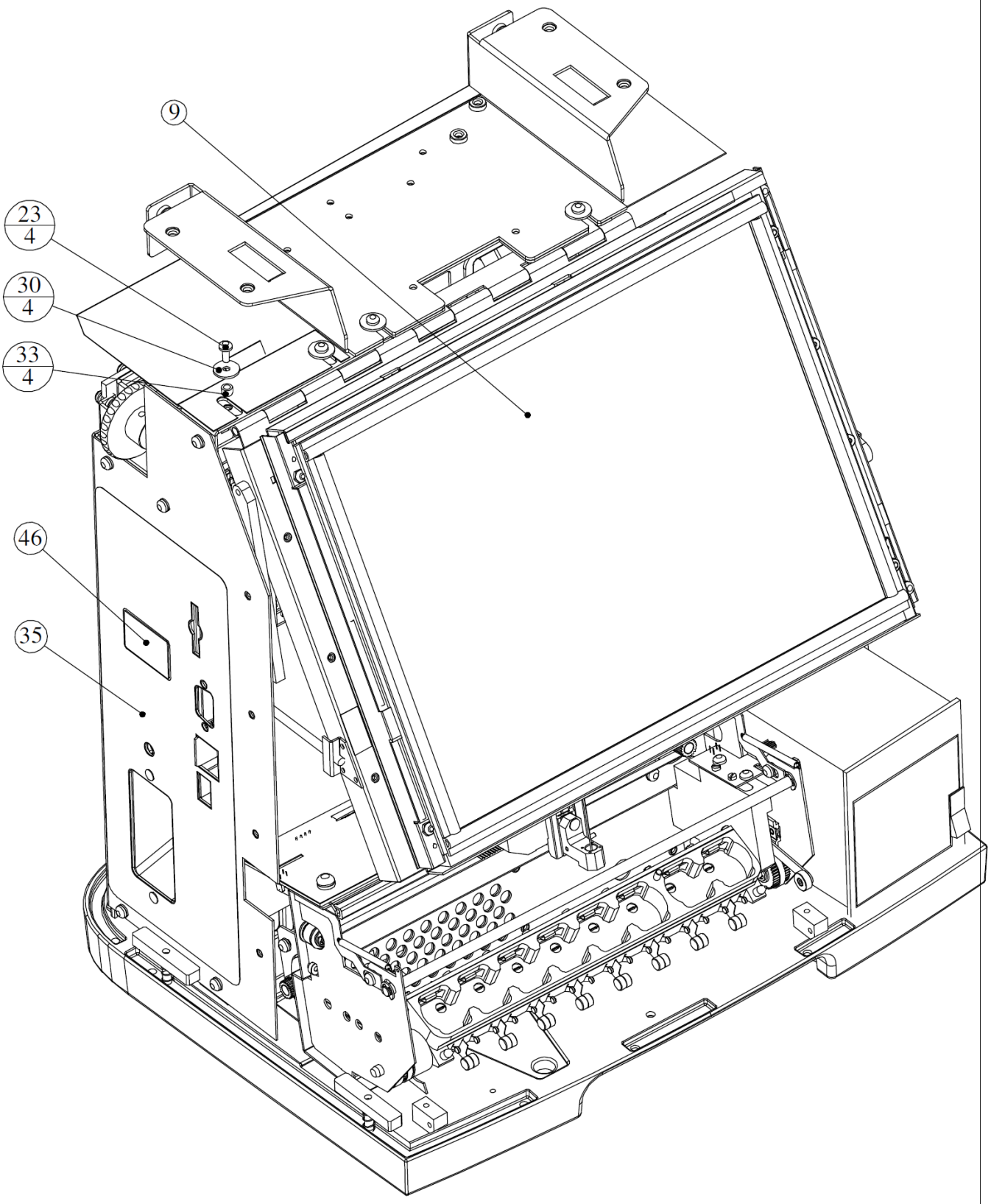

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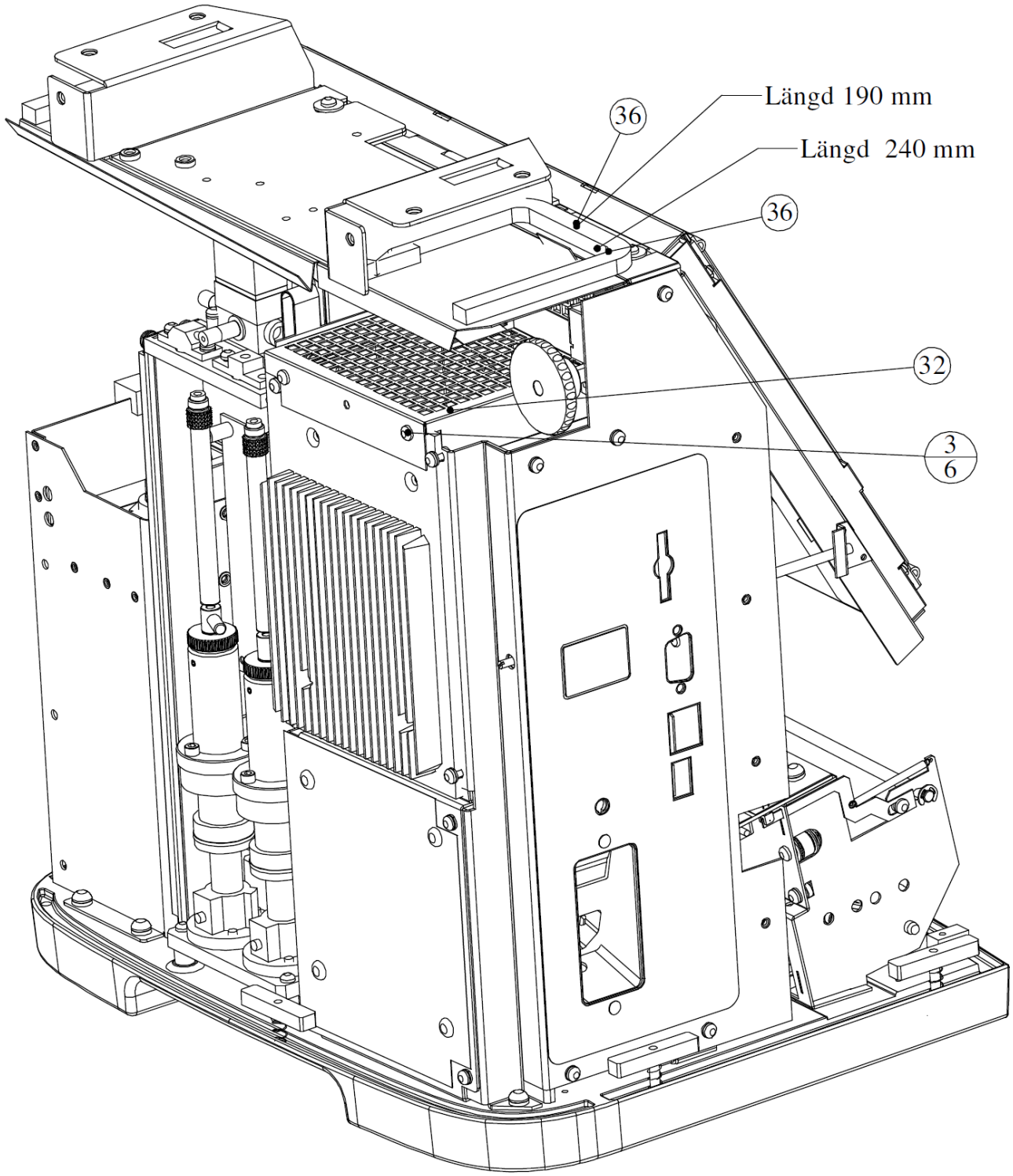
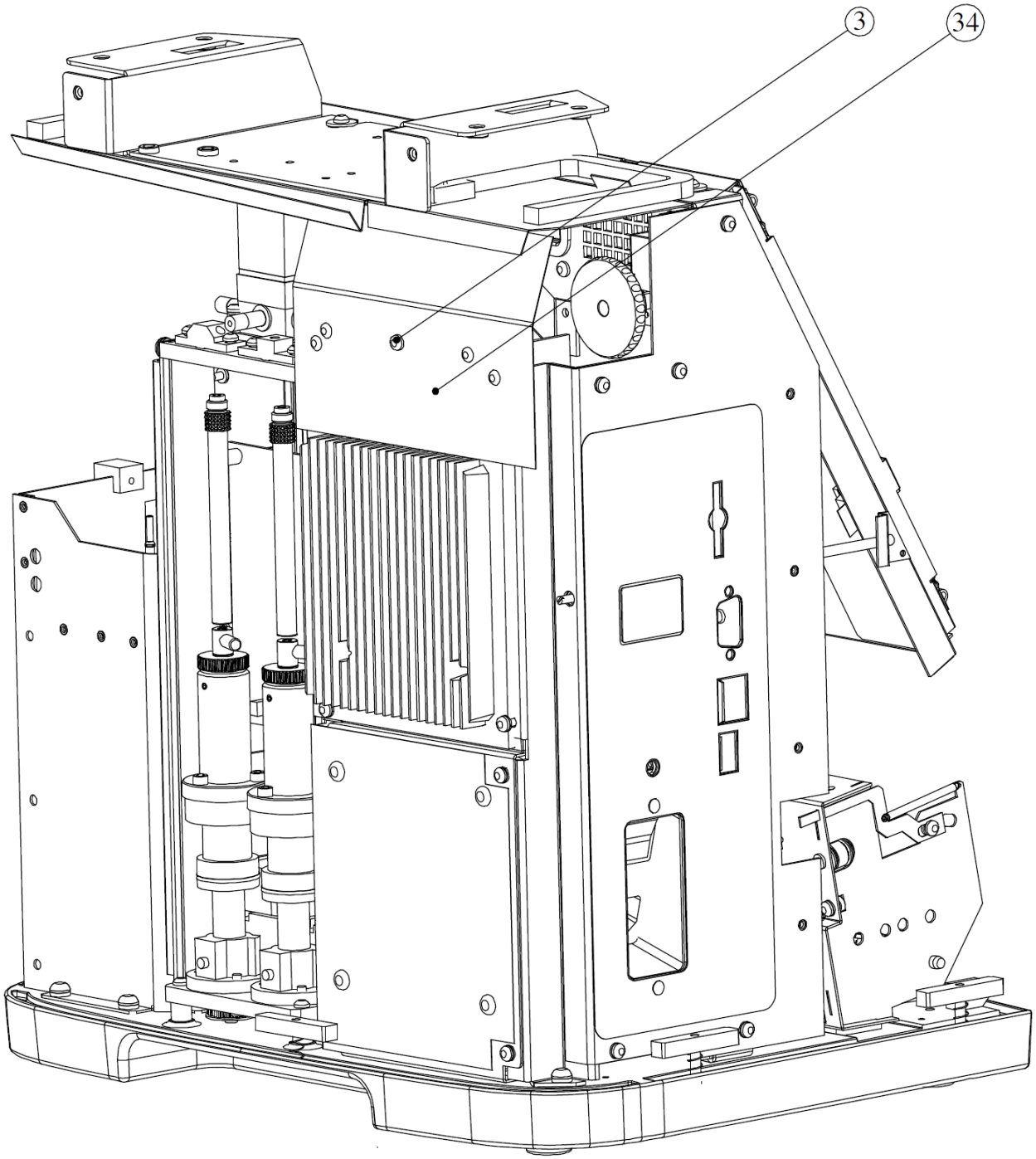
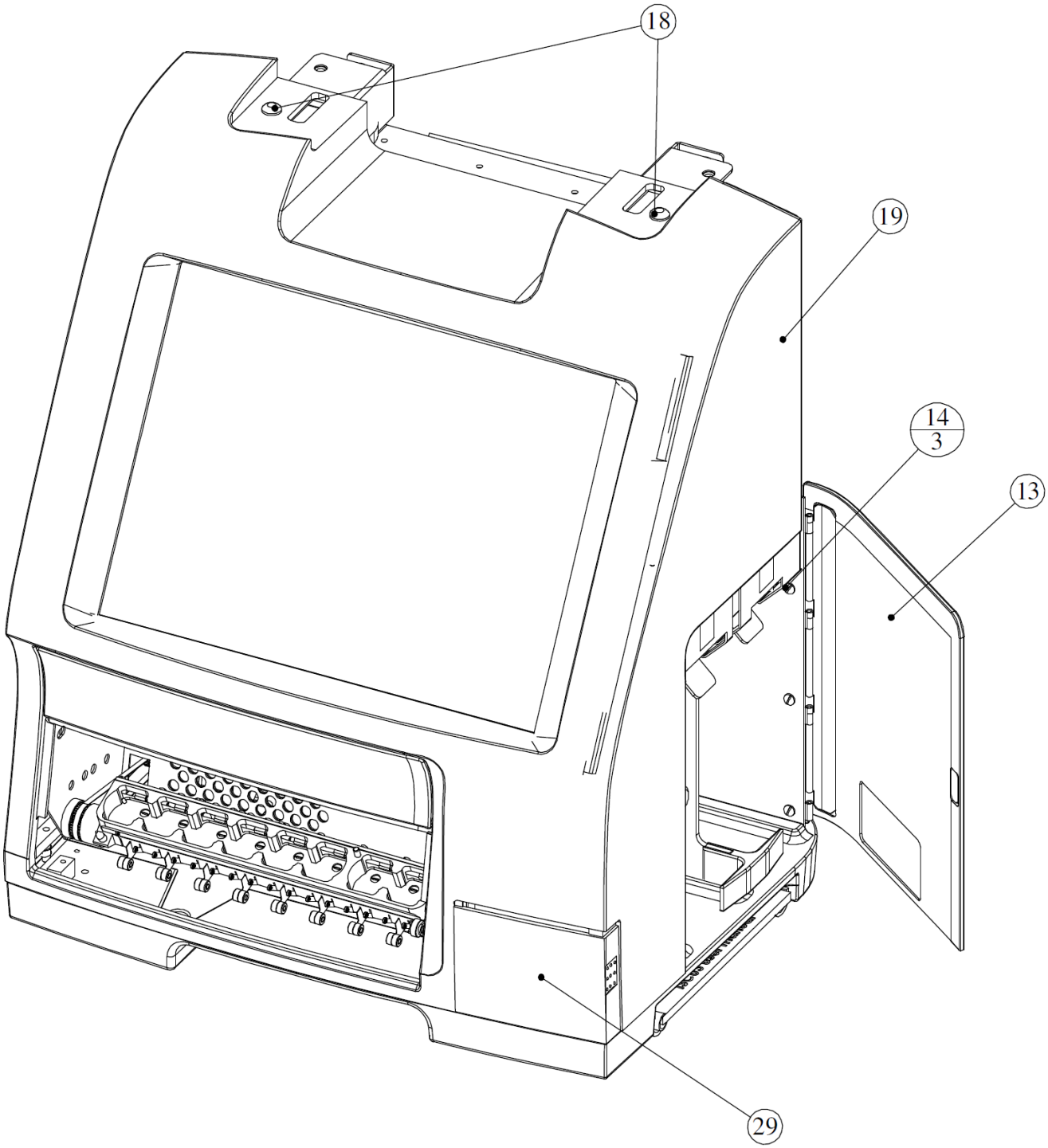


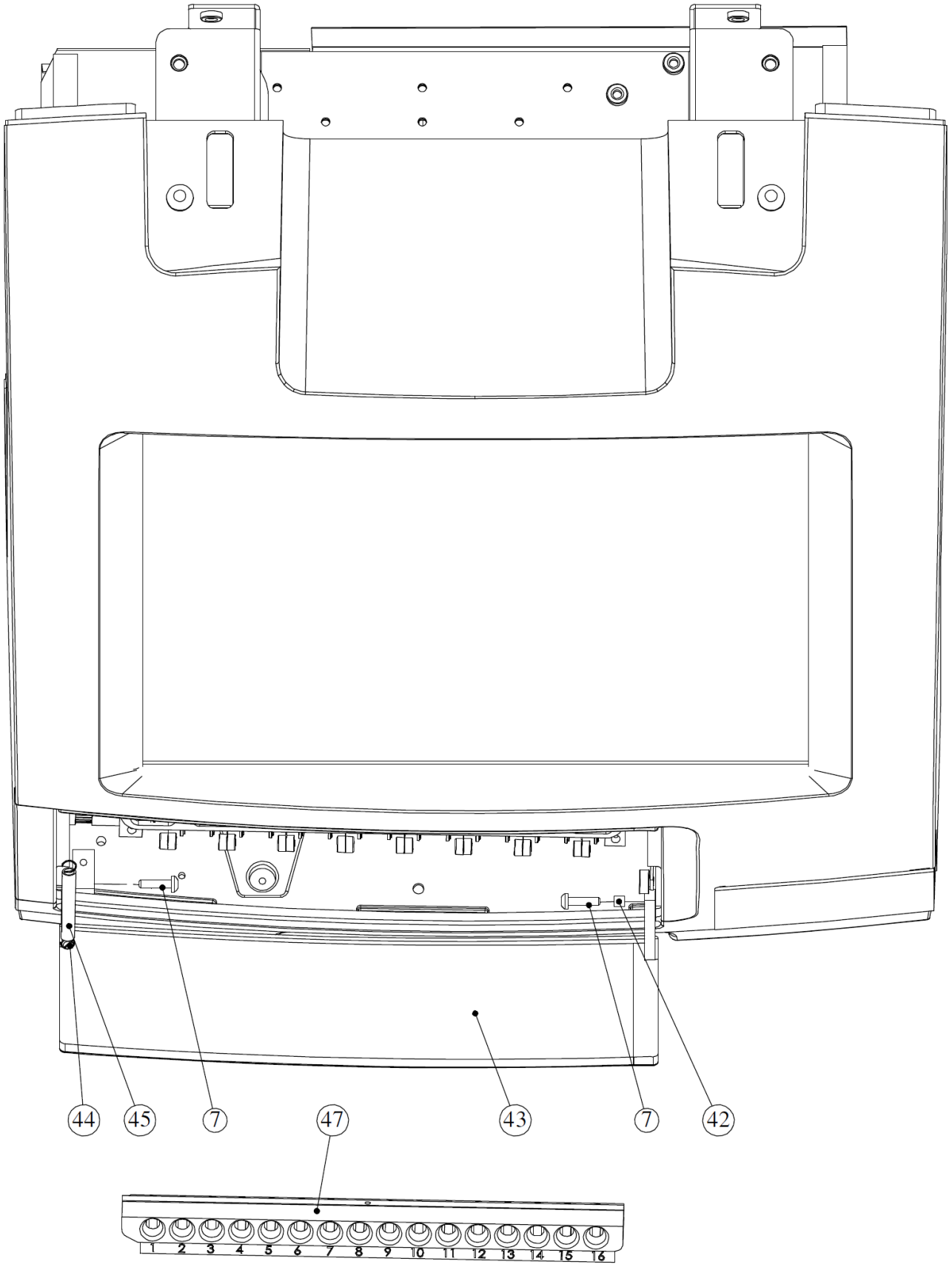
8003809 ISCUS Flex Analyzer



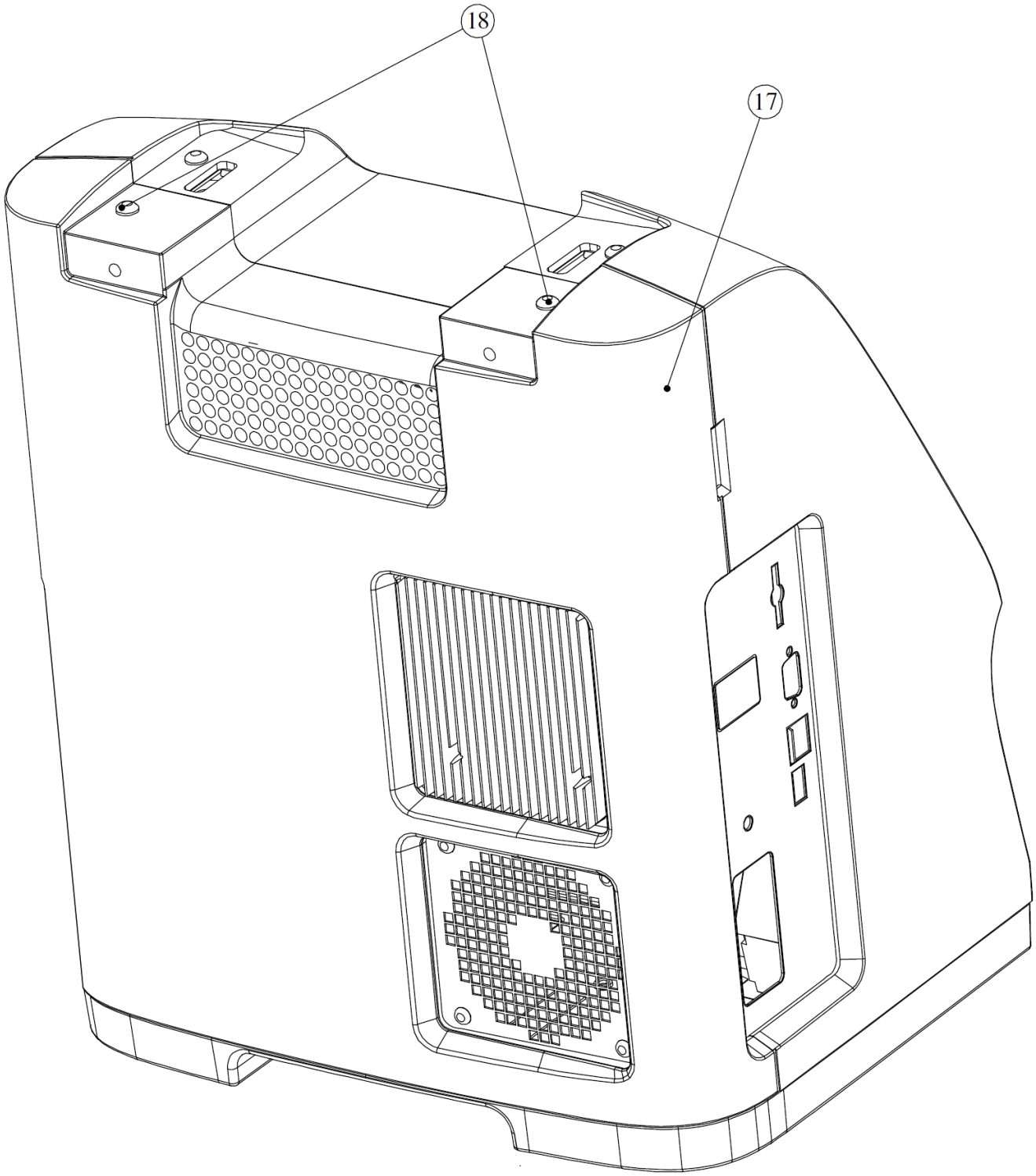
8003809 ISCUS Flex Analyzer



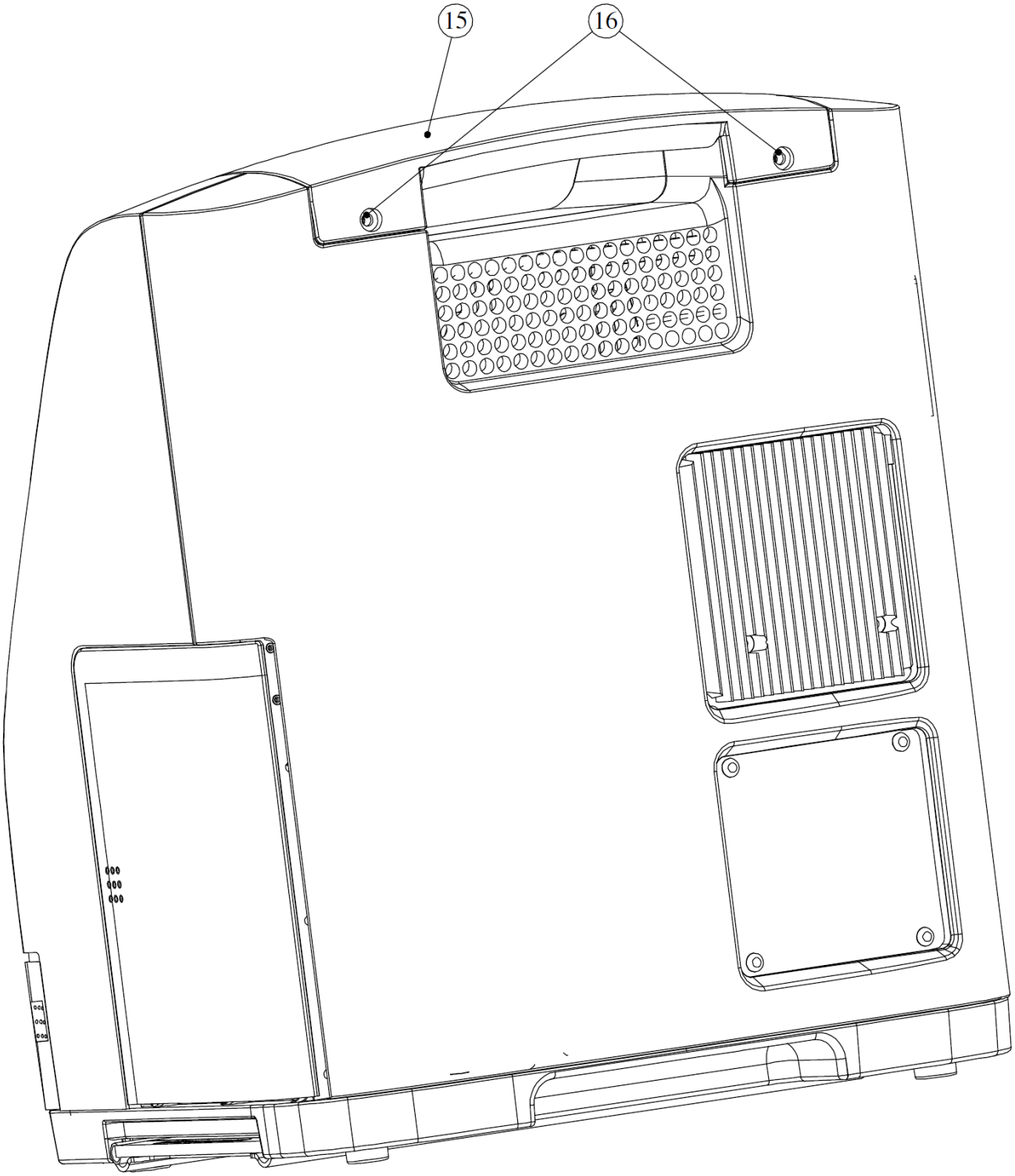
8003809 ISCUS Flex Analyzer



8003809 ISCUS Flex Analyzer



8003809 ISCUS Flex Analyzer



8003809 ISCUS Flex Analyzer Parts List

Position	CMA P/N	Description	Qty
001	8003399	Chassis complete ISCUS Flex	1
002	8003323	Main Board ISCUS 4	1
003	75403005	Screw MRT 3x5 A4	33
004	8002502	Spacer screw DSS M3050 x 18	10
005	8002190	Detector module ISCUS	1
006	8002642	Detector mounting plate	1
007	8001819	Screw MRT 3 x 12 A4	3
008	8002412	Detector cell ISCUS complete	1
009	8002630	LCD module complete	1
010	8002665	Adjusting screw	1
011	8002421	Adjusting screw	1
012	8002793	Screw P6SS M4 x 30 A2	2
013	8003351	Bottle lid complete ISCUS Flex	1
014	75023005	Screw LKCS 3 x 5 A4	3
015	8001932	Handle ISCUS	1
016	8002453	Screw MRT 4 x 20 A2	2
017	8002676	Rear cover	1
018	8001962	Screw MRT 5 x 10	4
019	8003197	Front cover complete ISCUS Flex	1
020	8001930	Adjustment knob	1
022	75063006	Screw SK6SS 3 x 6 A4	1
023	8001813	Screw MRT 3 x 8	11
024	8002650	Syringe pump module complete	1
025	8003203	Rinse and waste bottles module compl. ISCUS Flex	1
026	8002444	Screw MRT 4 x 5 A4	4
027	8003180	XZ-module complete ISCUS Flex	1
028	8001948	Printer ISCUS	1
029	8002658	Printer lid	1
030	M000062	Washer BRB 3.2 x 12 x 1 fzb	5
031	75140320	Washer AZ 3.2 A4 lock	14
032	8002664	Air shield	1
033	8002768	Spacer tube 3,2 x 5 L=3,2	4
034	8002797	Runoff sheet	1

035	8003332	Overlay ISCUS Flex	1
036	8002481	Seal 17 x 5 mm	0,7m
037	8003313	Washer FBB 3,1	15
038	8001831	Screw MRT M4	6
039	75140430	Washer AZ 4,3	6
040	M000105	Washer BRB 3,2x7x0,5	2
041	8003363	Holder for the front lid	2
042	8003347	Spacer DRM 3240x4	1
043	8003353	Front lid (Painted)	1
044	M000059	Screw CSS ST2,2x6,5	1
045	8003737	Spring	1
046	8002427	Sticker	1
047	8003205	Vial holder complete	1

4. Spare parts

P/N	8001721	Sample Cannula ISCUS
P/N	7431070	Sample Syringe 500µl
P/N	7431071	Wash Syringe 1ml
P/N	8002650	Syringe Pump Module ISCUS
P/N	8001894	Fan ISCUS
P/N	8002412	Detector Cell ISCUS
P/N	8002190	Detector Module ISCUS
P/N	8003180	XZ module complete ISCUS Flex
P/N	8003323	Main board ISCUS 4
P/N	8002752	Solenoid Valve ISCUS
P/N	8002754	Finger tight fitting for the solenoid valve
P/N	M000032	Nut KEL-F
P/N	M000033	Ferrule KEL-F
P/N	8001877	Power supply ISCUS 125W
P/N	8003203	Rinse/ Waste module ISCUS Flex
P/N	8001904	Stepper motor (X, Z, vial, reagent and syringes)
P/N	8001871	K ISCUS Photodiode
P/N	8001833	K ISCUS LED
P/N	8002765	K ISCUS LED complete with filters
P/N	8002454	Printer cable
P/N	8001915	Return Pump SP-500
P/N	8001948	Printer ISCUS
P/N	8002792	Maintenance kit ISCUS
P/N	8002605	Main Power Inlet
P/N	8002630	LCD module ISCUS
P/N	8003351	Rinse/waste bottle lid complete ISCUS Flex
P/N	8002676	Rear cover ISCUS Flex
P/N	8002802	Inspection / Cannula lid
P/N	8001932	Handle
P/N	8003197	Front cover complete ISCUS Flex
P/N	8003353	Front /vial/reagent lid ISCUS Flex
P/N	8002659	Printer lid
P/N	8002162	Thermal Print Paper ISCUS package of four

5. Maintenance service

Recommended interval: Once per year.

Maintenance consumables: 1 x Maintenance service kit ISCUS 8002792

The Maintenance kit includes.

D000011	Gasket syringe to syringe adapter	2 pcs
8001721	Sample Cannula ISCUS	1 pcs
7431070	Sample Syringe 500 ul	1 pcs
7431071	Wash Syringe 1 ml	1 pcs

Maintenance service:

1. Remove the cover and clean ISCUS Flex. See cleaning instruction, chapter 10.
2. Start the service software by pressing the "Maintenance button" in the cog wheel menu and then type the following code; 1, shift, A, 2, shift, B and 3. Click "OK" and wait for the system to restart.
3. Open the "Service" tab and replace the cannula. See replacement of cannula, chapter 9.2.
4. Open the "Service" tab and replace both syringes. See replacement of syringes, chapter 9.3.
5. Open "Step 3" tab. Check the signal levels by pressing "Start".
6. If the levels are lower than 1000 mV, adjust the light-diodes, normally they are adjusted to the maximum level, adjust the trim potentiometer for VIS-light and do the same on the trim potentiometer for UV-light.
7. If it is not possible to get the signal levels higher that 1000 mV, perform a cleaning of the cell see chapter 10. If it does not help replace to a new cell.
8. If major hardware repairs have been done, perform the mechanical test according to the service software mode "Service tab" "**Go to all positions**"
9. Run " Cell test". Load a cassette with destilled water in the third position. Put in the cassette by pressing "Reagents" and then "Change" and choose "Production". Open " Module Test" Start " Cell Test". Check the result in " Step 4".
10. Run the RSD test: Repeatability with vials 0,2µl.

    Select "Step 4" tab.

    Load a cassette with Amido black in the first position from the left and water in the second position. Put in the cassette by pressing "Reagents" and then "Change" and choose "Production".

    Skip the optical, repeatability with vials 0.5ul, carry over and glucose test by pressing them once.

    Press "Run tests".

    Insert four empty vials.

    Press "OK" and the test will start.

    Make sure the results are within correct levels. If results are not within correct levels, restart the test again, but pre-fill four vials with Amido black and clean out the auto fill square. If the test still does not work, check the cannula and also check that air bubbles are not present in the sample syringe.

    When the test is OK, reset the service flag, turn off ISCUS and restart in normal mode.
11. Load the analyser with reagents and calibrate the system.
12. Run control samples. Put in a vial in the CS position in the vial holder and analyse the sample. Press the "Control Samples" button to look at the results. **Make sure that the results are within the range for each analyte.**

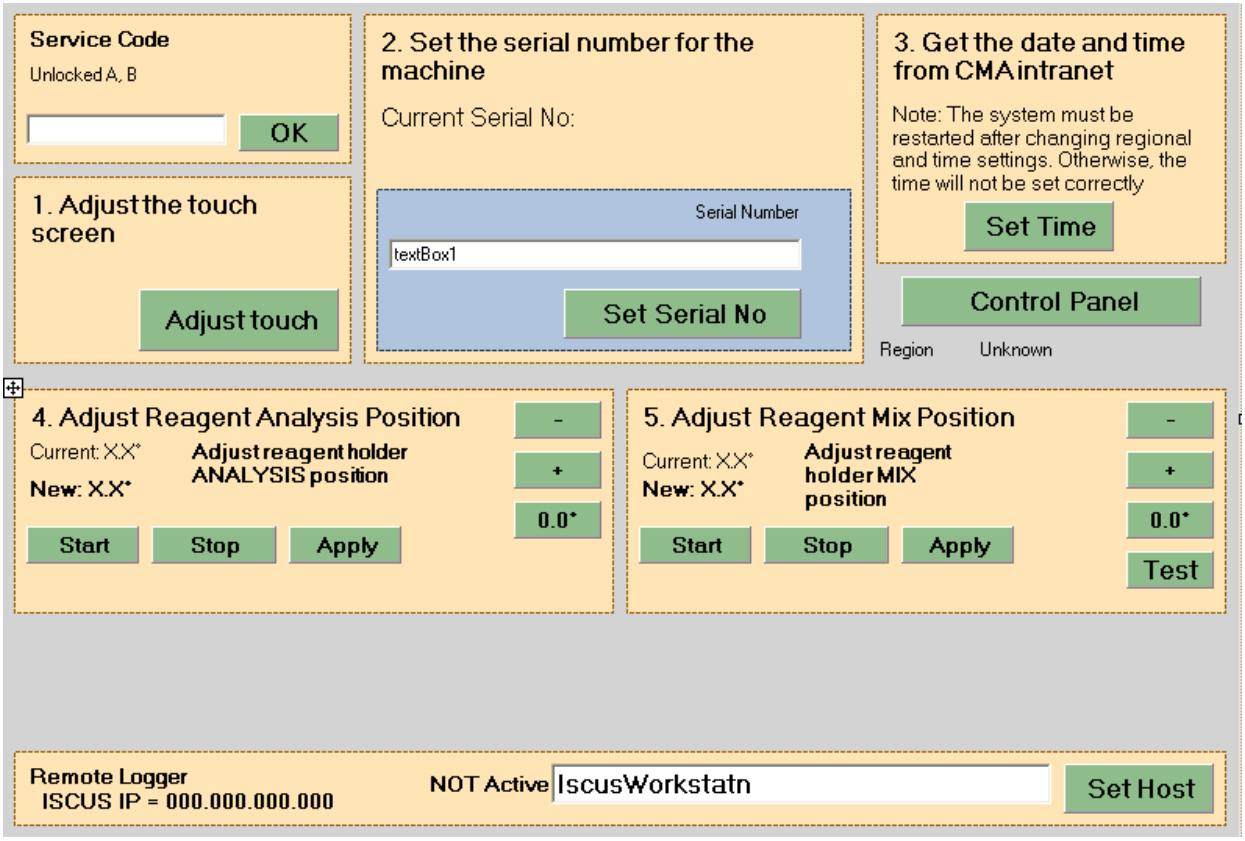
6. Service software mode

The service software mode is developed for maintenance, testing and troubleshooting the ISCUS Flex analyser.

To activate the service software, enter the “cogwheel menu” and mark the checkbox “Maintenance”. Click on “Service code” and type the following; 1, shift, A, 2, shift, B and 3. “OK”, the system will restart and the following menu appears:

To reach the higher service level, type service code ”main” or “dart” in the field for service code and press ”OK”.

Production Step 1



Here follows an explanation of each of the buttons on the screen:

1. Adjust touch

Makes a calibration sequence of the touch screen. Just follow the instructions on the screen. Press once on the screen when the calibration is ready, to confirm settings. If the screen is totally out of alignment and it is not possible to reach the correct buttons on the screen, an ordinary keyboard can be connected to the ISCUS by the USB port on the left side.

2. Set Serial No.

If you want to type in the serial number once again if the data have been lost after reloading the software. See Trouble shooting. Normally entered only in production, as it is a factory setting. It should be the same as printed on the S/N label on the left side of the ISCUS.

3.Set time

Used only in CMA production of the ISCUS Flex.

Control Panel

Makes access to windows control panel. Mostly used when the language/ regional settings and time/ date is changed.

4. Adjust Reagent Analysis Position

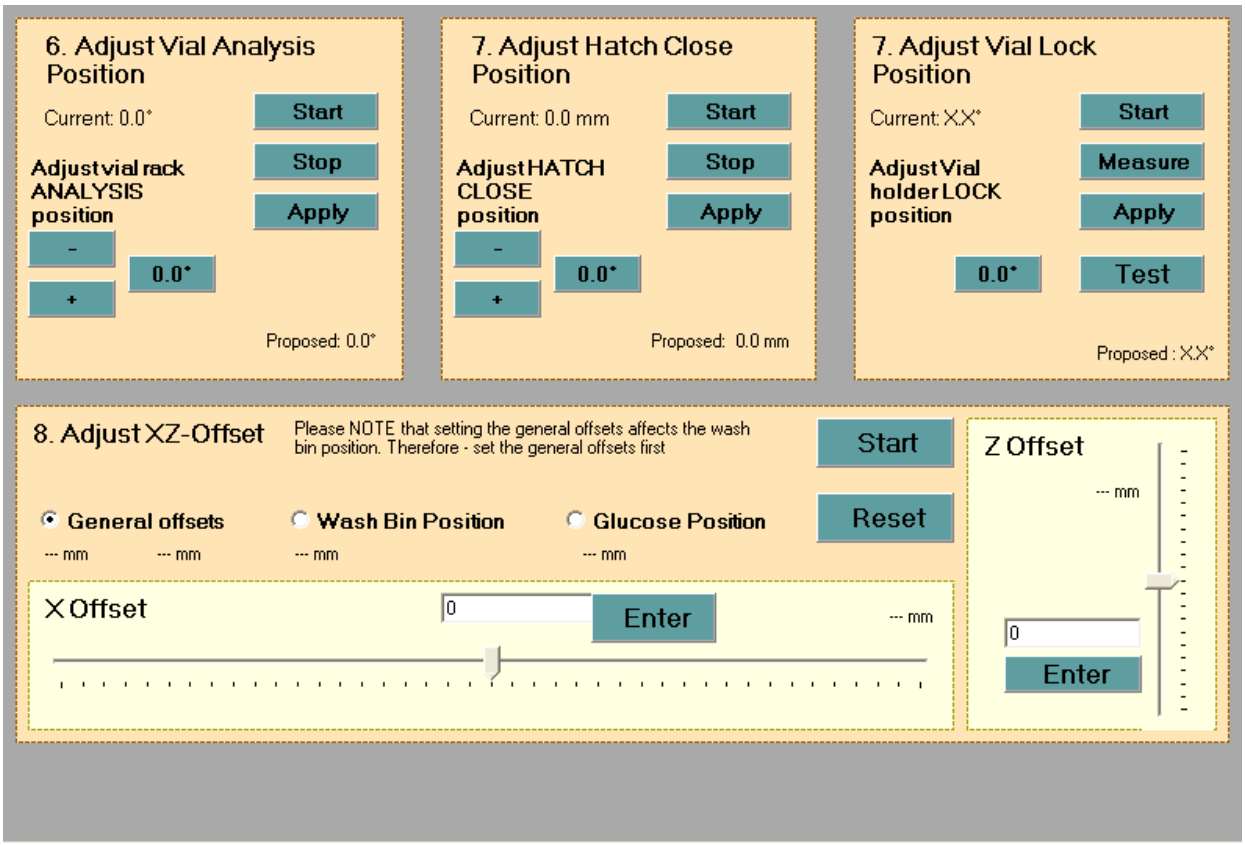
This parameter is normally set to – 0,10 ° just because the vials can otherwise hit the lid during the mixing.

The angle can be adjusted by pressing the minus button twice. When you are satisfied press “Stop”. Wait until the instrument has calculated the angle. Press “Apply” to confirm.

5. Adjust Reagent Mix Position

Put in a reagent cassette and press “Start”. Adjust the reagent holder position by clicking the minus button. Click several times until the cassette hits the rear stop. Then move the cassette five steps with the plus button. Then press “Stop”. Wait until the instrument has calculated the angle. Press “Apply” to confirm. Press “Test” to check that the movement is OK.

Production Step 2



6. Adjust Vial Analysis Position

Put in a vial cassette and load the first and the last position with a vial and press “Start”.

Lift up the cannula and move the X-carriage (needle) by hand to a position above one of the vials.

Check that the cannula is above the center of the vial in Y-led, if not, adjust with plus or minus button and then check the same with the other vial. If the value is not the same for both vials set the value to something in-between.

Press “Stop”. Wait until the instrument has calculated the angle. Press “Apply” to confirm.

7. Adjust Hatch Close Position

Must be adjusted with the covers on.

Press “Start”. Press the plus button several times until the front lid starts to open. Then press five times on the minus button. Then press “Stop”. Wait until the instrument has calculated the angle. Press “Apply” to confirm.

8. Adjust XZ-Offset

Start to adjust the General offset. Make sure that you have a vial in the first position of the cassette.

Press “Start”. Check that the cannula penetrates the centre of the vial in X-led. Adjust by clicking left or right of the arrow on the ruler. Press “Enter” to save the new value.

Then check the Z-value. Press “Start” and check that you can see at least 0,5 mm of the tip of the cannula when it penetrates the septa. If not adjust with the plus or minus button for Z. Press “ Enter” to save.

Press “stop” and the cannula will go back to the wash bin.

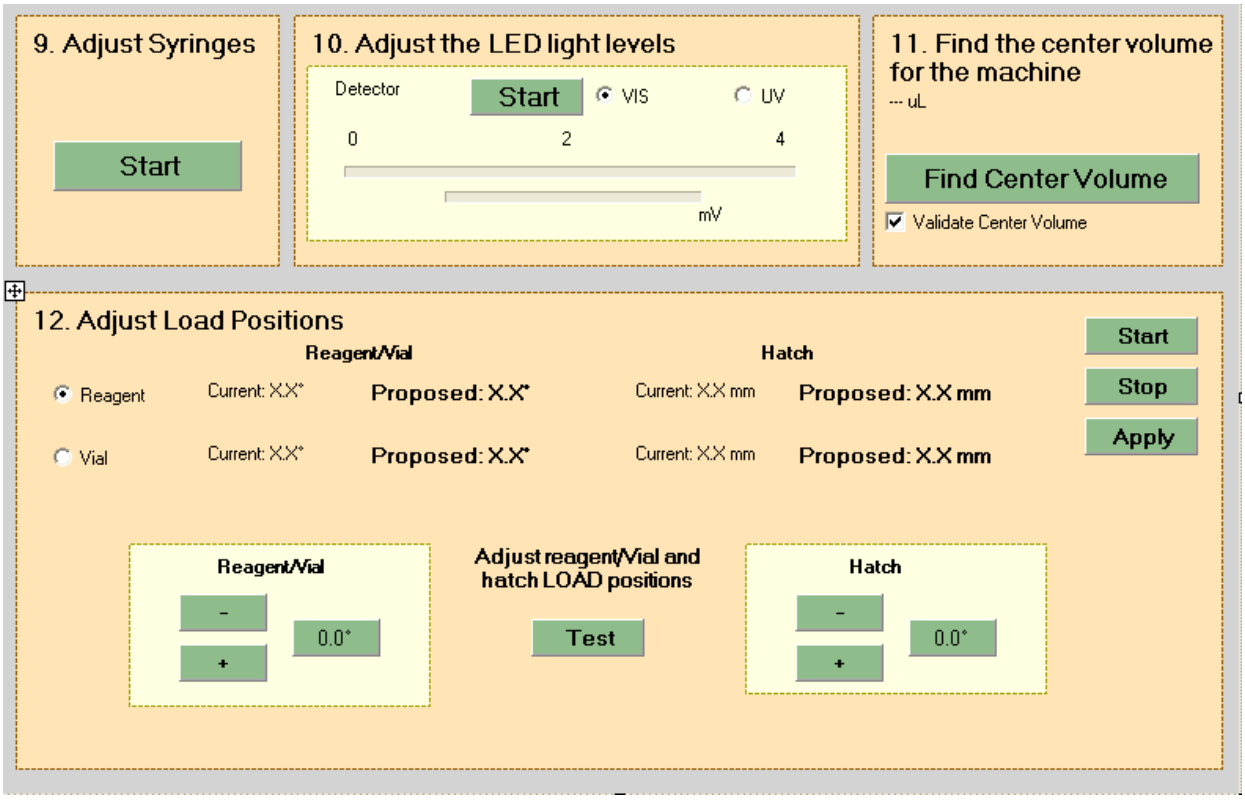
Adjust the “Wash bin position”. Press “Start” again.

Check that the centre mark of the cannula guide correlates to the centre mark of the wash bin. Adjust in X-led by clicking right or left of the arrow on the ruler.

Press “Enter” to save the new value.

Press “stop” and the cannula goes back to the wash bin.

Production Step 3



9. Adjust Syringes

It is not necessary to adjust the syringes if only the software is reloaded.

Press “Start” and wait for the syringes to go to the home positions. Unlock the adjustment screw on the **sample** syringe and adjust it up until the syringe piston hits the top. Then back it off half a turn and lock it.

Unlock the adjustment screw on the **wash** syringe and adjust it up until the syringe piston hits the top. Then back it off one turn and lock it. Press “Stop”.

10. Adjust the LED light levels

It is not necessary to adjust this when the software is reloaded.

Choose which light level you want to check, VIS or UV.

Press “Start”. ISCUS will now measure the signal level. It takes approximately one minute. If you want to check the level on the other light, press “Stop” and change to UV or VIS.
When the main cover is removed it is possible to adjust the LED´s with the trim potentiometers on the detector module. To adjust VIS, use the left, and UV, the right potentiometer.
Normally the potentiometers are set to maximum. If the signal is very high it is recommendable to adjust it down to 3000 mV.

The ISCUS can measure correct even with signal levels down to 100mV.

11. Find the center volume for the machine

Press “Find Center volume” and the ISCUS will start looking for the center volume. It takes about 3 minutes if everything works OK. If it takes longer, it may depend on air in the liquid system. Check cannula connection and peek tubing connections. If the check box is marked then it will validate the new center volume.

12. Adjust Load Positions

This adjustment can only be done with the cover on.

Mark “Reagent” and press “Start”. The front lid will open. Adjust the Hatch with the plus minus button. The “opening arm” shall be 5 mm from hitting the cover on the right side of the lid.

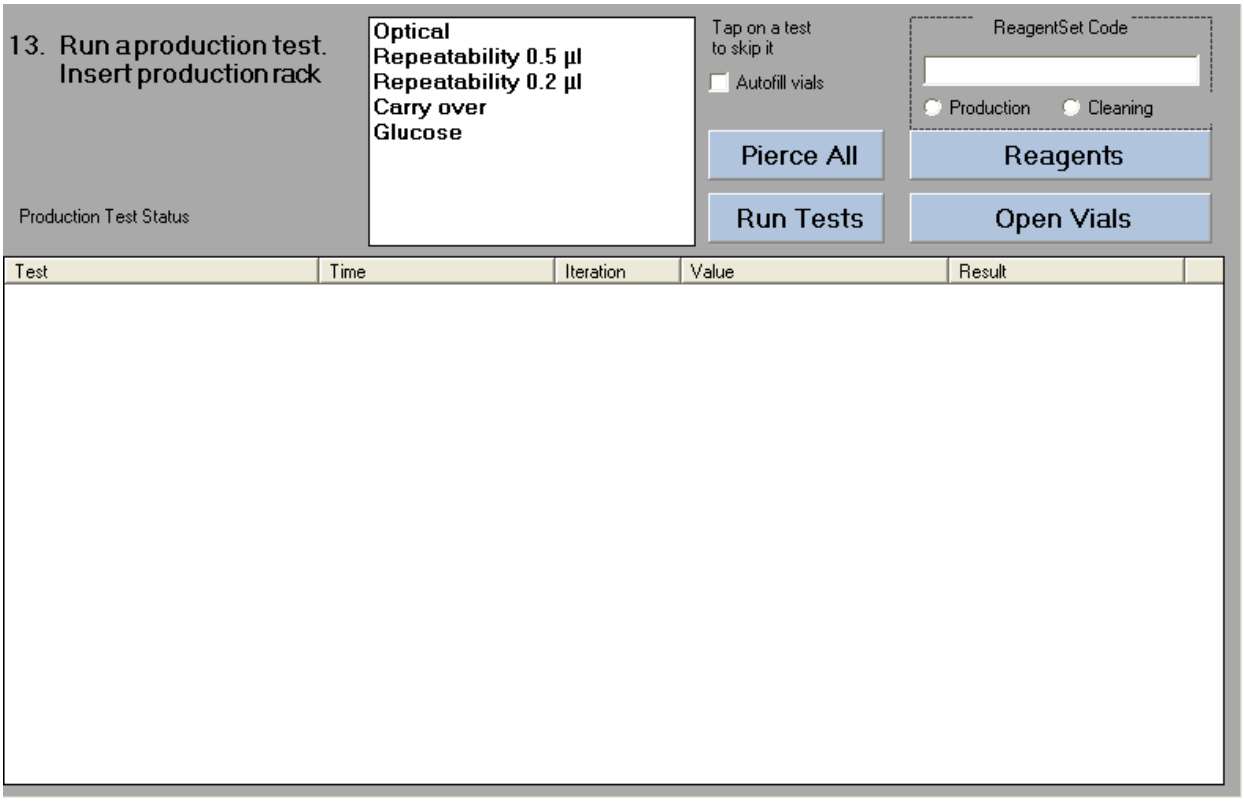
Adjust the opening of the lid by the plus or minus button (Reagent/vial) to make an easy access to the reagent.

Then press “Stop” and then “Apply”.

Do the same procedure with the “Vial” parameter.

Adjust the opening of the lid by the plus or minus button (Reagent/vial) to make an easy access to the vials.

Production Step 4



13. Run a production test. Insert production cassette

To run a production test: Load the production cassette by pressing “Reagents” and then “Change” and choose “Production”.

Put in the production cassette which contains; Amido black solution, $NaNO_2$, H_2O, Glucose reagent and calibrator.

Close the reagent lid by pressing “Return”

Choose which of the tests you want to run;

Optical test = usually done after a change of the detector cell

0,5µl repeatability with vials = 2 x 20 samples (require very high demands of the instrument)

0,2µl repeatability with vials = 1x 20 samples normally done after the maintenance.

Carry over = usually done by CMA Production test dept.

Glucose = usually done by CMA Production test dept.

Tap on the test if you want to skip one or more of them.

If you want the ISCUS to auto fill the vials, mark the check box “Auto fill vials”.

To start the test, press “Run tests”. Follow the instructions on the screen. After inserting vials, press “OK ”. The result of the test will appear on the screen. The tests will stop automatically before it is ready if the result will be out of range. The test will then have to be restarted.

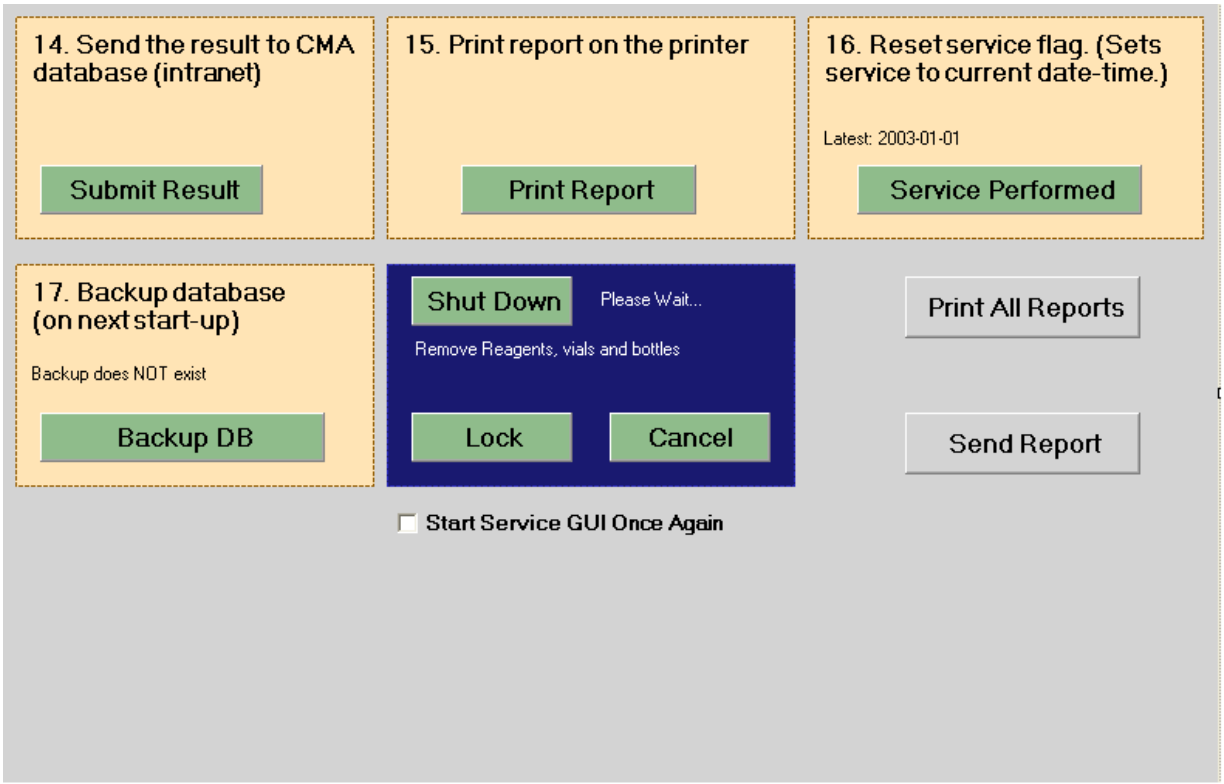
See more info in the chapter of Maintenance service.

A cleaning procedure can also be run from this tab. Insert the Cleaning Cassette and press “Reagent” and “change” and choose “Cleaning”. Then “OK”. The cleaning will now start.

The cleaning rack contains; A bottle of Sodium Hypochlorite and a bottle of Nitric acid.

See the chapter cleaning of instrument.

Production Step 5



14. Send the result to CMA database (intranet)

Press “Submit Result”. Only for internal use.

15. Print a report on the printer

Press “Print Report” when you want the ISCUS to print the test results on the printer.

16. Reset the service flag

Press “Service performed” to reset the service flag. A new warning for old syringes and cannula will show next time after 13 months.

17. Backup database (on next restart)

Press “ Backup DB” and the database will be backed up at next start up.

Shut Down

Press “shut down” to make ISCUS shut down correctly. Remove reagents, vials and press “Lock”, the instrument will now shut down and lock.

Lock

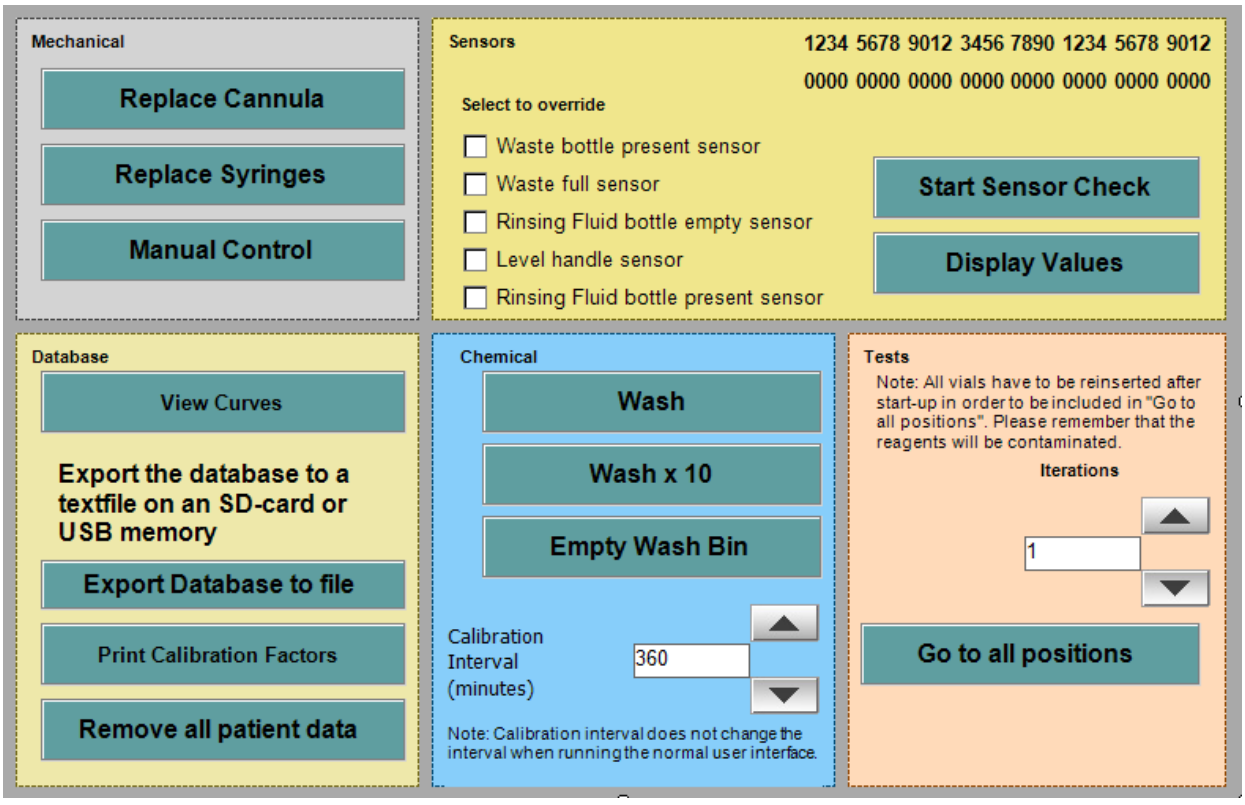
This is not a recommendable way to turn off the instrument.

A faster way to shut down the instrument without removing any liquids. **Warning.** The instrument will not evacuate the wash liquid from the wash basin.

Start Service GUI Once Again

If the check box “Start Service GUI Once Again” the instrument will start up in Service mode directly after next restart.

Service tab


Mechanical
Replace Cannula
Replace Syringes
Manual Control
Sensors
1234 5678 9012 3456 7890 1234 5678 9012
0000 0000 0000 0000 0000 0000 0000 0000
Select to override
Waste bottle present sensor
Waste full sensor
Rinsing Fluid bottle empty sensor
Level handle sensor
Rinsing Fluid bottle present sensor
Start Sensor Check
Display Values
Database
View Curves
Export the database to a textfile on an SD-card or USB memory
Export Database to file
Print Calibration Factors
Remove all patient data
Chemical
Wash
Wash x 10
Empty Wash Bin
Calibration Interval (minutes)
360
Note: Calibration interval does not change the interval when running the normal user interface.
Tests
Note: All vials have to be reinserted after start-up in order to be included in "Go to all positions". Please remember that the reagents will be contaminated.
Iterations
1
Go to all positions

Wash x 10

Press “ Wash x 10” to make the syringes wash 10 times.

Wash

Press “Wash” to make the syringes wash once.

Start Sensor Check

Start the sensor check by pressing “Start Sensor Check”. While this sensor check is active it is possible to check all sensors by activating them manually.

Here is a list of all the sensors;

1. Vial Holder home position = Active
2. Motor X Home = Active
3. Cannula Sensor = Not active
4. Motor Z Top = Active
5. Reagent Rack inserted = Active
6. Rubber stopper sensor bar pushed = Active
7. Reagent home position = Active
8. Not in use
9. Not in use
10. Not in use
11. Not in use
12. Vial 1 inserted = Active
13. Vial 2 inserted = Active
14. Vial 3 inserted = Active
15. Vial 4 (control sample) inserted = Active
16. Sample Syringe empty = Active
17. Waste bottle inserted = Active
18. Rinsing fluid bottle inserted = Active
19. Rinsing/Waste bottle sensors lever down =Not active
20. Wash syringe in home position = Active
21. Rinsing fluid bottle empty = Active
22. Waste bottle full = Active
23. Cannula Wash bin empty = Active
24. Not in use
25. Not in use

Replace Cannula

Press “Replace Cannula” and follow the instructions on the screen.

Replace Syringes

Press”Replace Syringes” and follow the instructions on the screen.

Print Calibration Factors

A calibration report will be printed where the values of the two calibration points of each analyte will be presented.

Go to all positions

Open the **Production Step 4** tab and press " **Reagent**" and "Change" and mark Production. Insert an empty reagent cassette with caps and 16 empty vials.

Press Open/ Close Reagent and put in an empty or old reagent cassette. Use the production cassette mode. Go back to the "Service" tab and press "Go to all positions". The cannula will now go to all positions once. If the button is pressed several times it will perform several cycles.

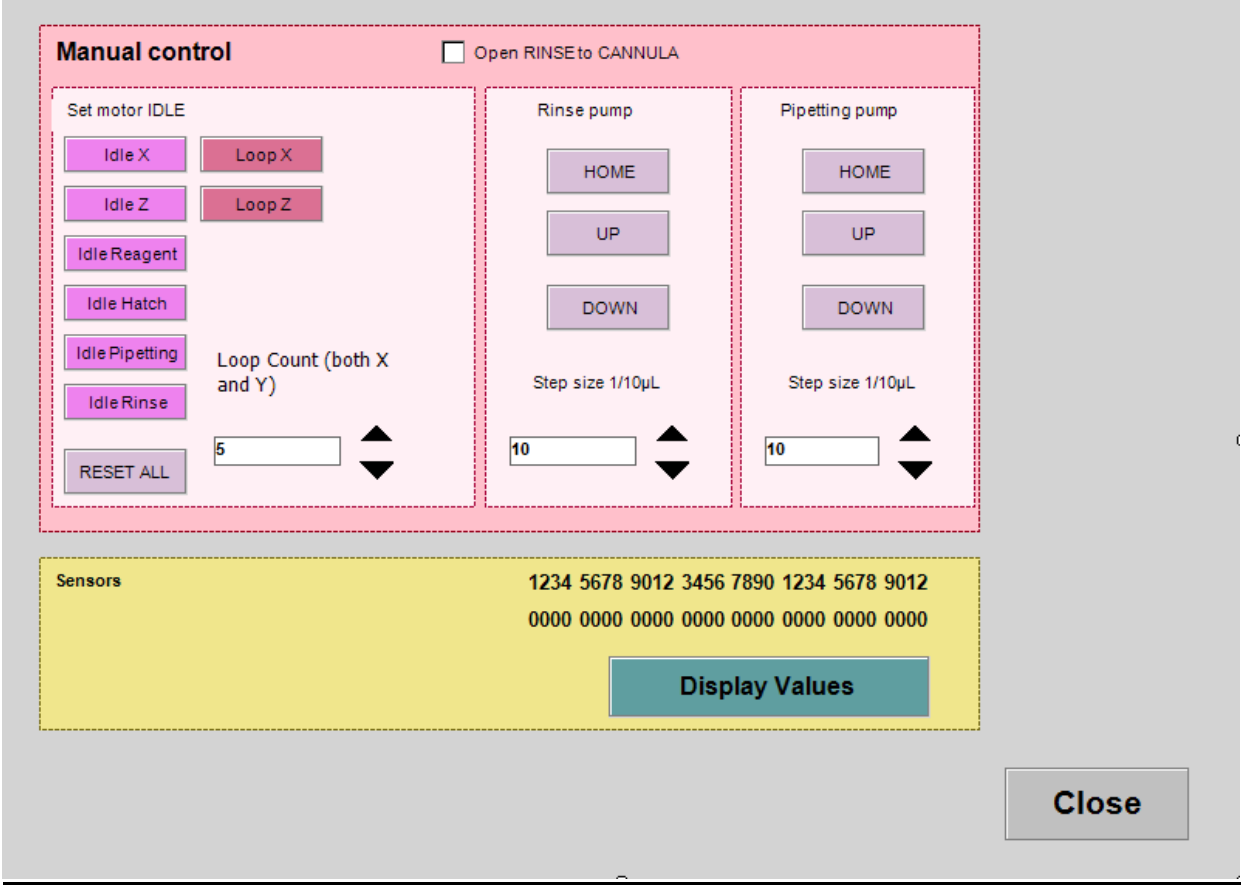
Remove all patient data

Removes all data from the database.

Export Database to file

Will export the database to a text file on a SD-card or USB memory.

Manual Control

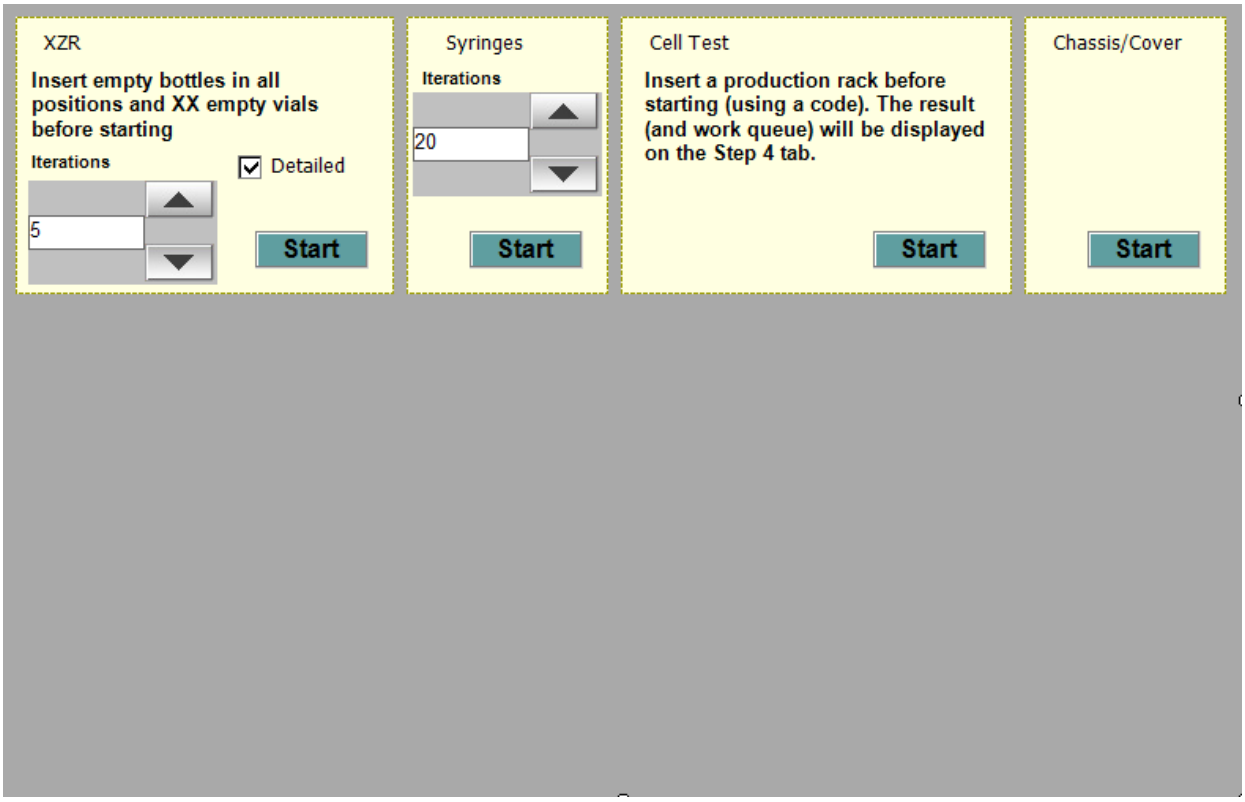


If you want to move the different movements manually it is possible to set the specific motor on idle. Just choose a button or buttons of which motor you want to set on idle. Then the motor for that specific movement will be set on idle. To reset the motors just press " Reset all" or close the window.

It is also possible to run a Loop or macro for the X, Z, rinse and pipett syringe.

If the "Display values" button is choosen the active sensors will be displayed.

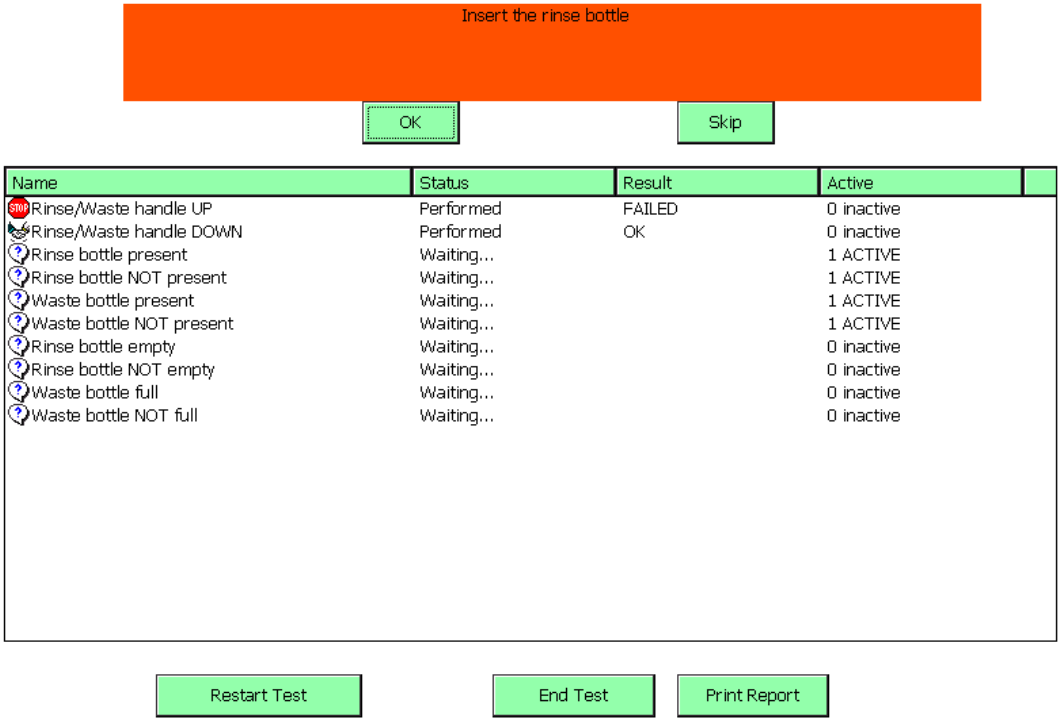
Module Test tab



Chassis/Cover

This function checks the sensor switches for the Rinse and Waste bottle.

Follow the instructions on the screen. When you have performed the test it is possible to print out a report to save the result.


Insert the rinse bottle
OK
Skip
Name
Status
Result
Active
Rinse/Waste handle UP Performed FAILED 0 inactive
Rinse/Waste handle DOWN Performed OK 0 inactive
Rinse bottle present Waiting... 1 ACTIVE
Rinse bottle NOT present Waiting... 1 ACTIVE
Waste bottle present Waiting... 1 ACTIVE
Waste bottle NOT present Waiting... 1 ACTIVE
Rinse bottle empty Waiting... 0 inactive
Rinse bottle NOT empty Waiting... 0 inactive
Waste bottle full Waiting... 0 inactive
Waste bottle NOT full Waiting... 0 inactive
Restart Test
End Test
Print Report

XZR

Open the **Production Step 4** and press " **Reagent**" and "Change" and mark Production. Insert an empty reagent cassette with caps and 16 empty vials. Go back to the Module test tab and press the "Start" button for the XZR. Follow the instructions on the screen. A check of the reagents, vial and detection bar sensors will be performed. The cannula will go to all positions.

Cell test

Insert a "production" cassette before starting. A "production" cassette contains:

From the left: Amido black, 0,26M NaNO2, H_20, Glucose, 1450µl H_2O, Calibrator A. But to run the "Cell Test" it is only necessary to use the H_2O. (Destilled).

Open the **Production Step 4** and press " **Reagent**" and "Change" and mark production to load the reagent. Go back to the Module Test tab and press, "Start" to start the test.

The result will be displayed on the **Production test 4** tab.

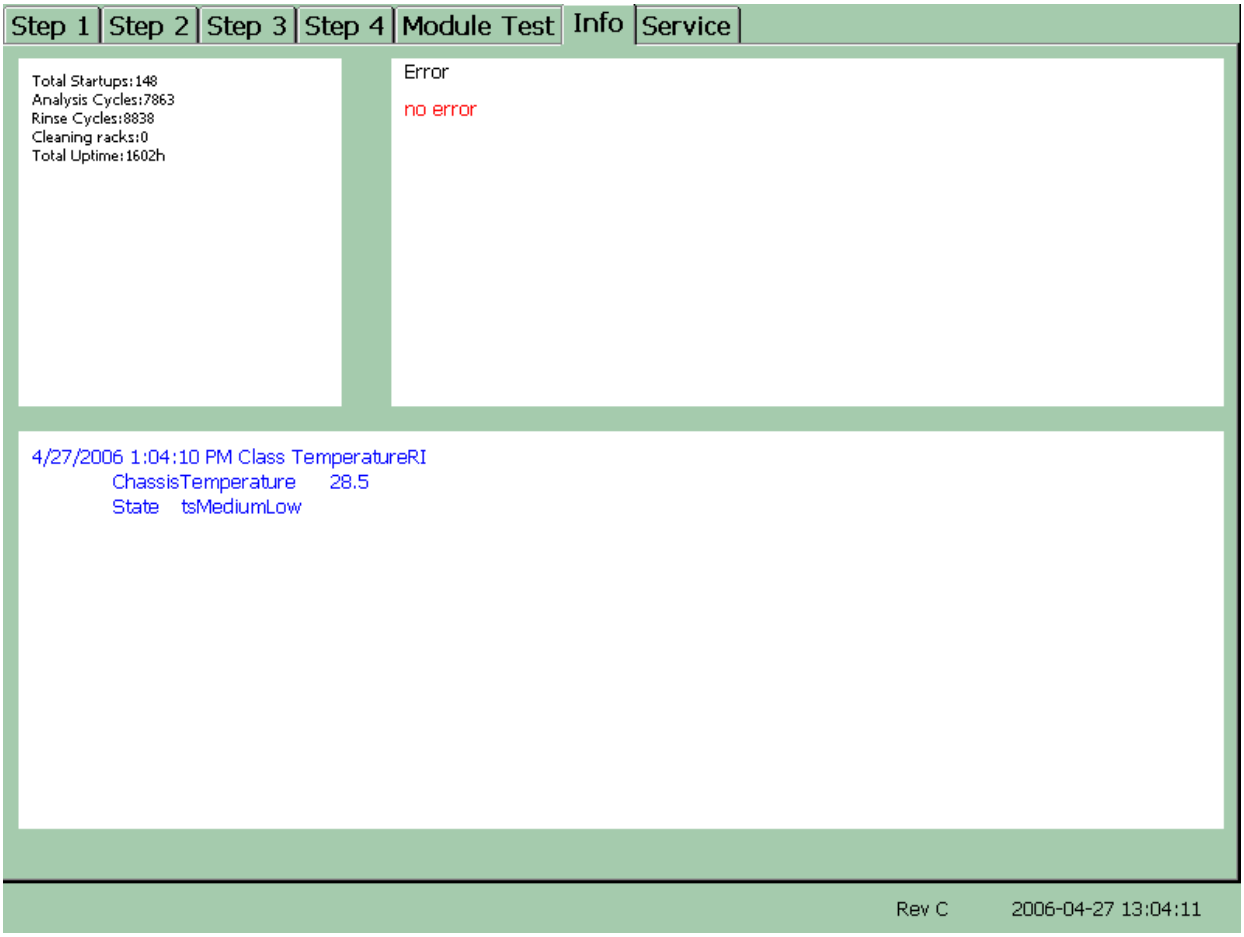
Syringes

Choose how many " iterations" you want the syringe pump to perform.

Press "Start" to make the test sequences for the syringes. A message "Module test OK" will appear if the test was OK.

Info tab

Gives some info about error messages, total uptime, total amount of cycles and chassis temperature.



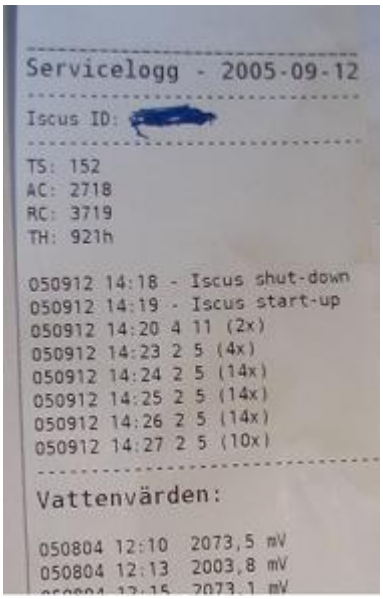
7. Trouble shooting

7.1 Hardware faults

1. Gather all information you can found out about the problem. Start asking the operator to make it easier to find out info about the problem. You can either print out the error list by pressing "Print Service Log" or look at the files in the instrument.
2. Decode any error messages that may occur by the help of **"How to Decode the Iscus Logfile**" Chapter 8. In the decoder instruction there are suggestions of which module and movement that has to be checked.

Example:

This is a part of a printed log file.



The first rows give us the following info:

TS= Total Start-ups AC=Analyse Cycles RC=Rinsing Cycles CR=Cleaning Racks TH=Total Hours

In the first column the dates are shown, the second column the times are shown, and in the third method nr and the error #. Within the brackets is the number of currencies during that minute are shown.

The error codes 2 and 5 are frequently represented in the log file example. 2 stands for method and 5 stand for error #.

Look for method 2 and error no. 5 in the **"How to decode the ISCUS Log file"** where you can read; Cannula sensor photo interrupter is unexpectedly activated. Under "measures" you can read:

Check for obstructions.

Check Z conveyer belt.

Check Z photo interrupter and connectors.

You can also check this:

Check the Z-sensors (Sensor Check in the service software).

Check the slide bearings for the Z-movement.

Check/replace the Z-motor.

Follow the above procedure for all mechanical errors in the ISCUS.

7.2 Calibration, control samples or normal samples faults

Example of logfile.

If the calibration values are missing like this, make the following checks:

1. Check/replace Cannula.

2. Check all connections to the Peek tubing. Check that the connections are tightened correctly, so that no air will let into the liquid system. Make a cell test to determine if the liquid system is tight.

3. Check/replace detector cell.

4. Check/replace sample syringe. If the syringe is older than one year or if there is a leakage between the piston and the glass we recommend that you replace it.

5. Check/replace wash syringe.

6. Check/replace valve solenoid.

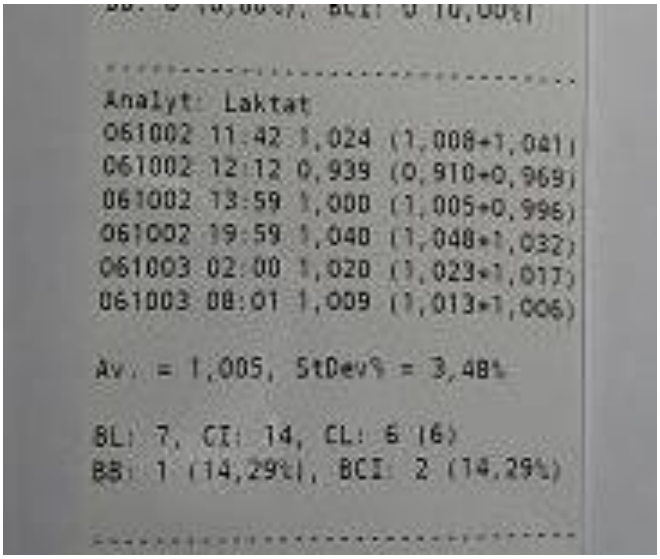
7. Check/replace sample syringe pump driving.

8. Check/replace detector module.

9. Check/replace wash syringe pump driving.

10. Check/replace main board.

Below is a part of another printed log file.



```
Analyt: Laktat
061002 11:42 1,024 (1,008+1,041)
061002 12:12 0,939 (0,910+0,969)
061002 13:59 1,000 (1,005+0,996)
061002 19:59 1,040 (1,048+1,032)
061003 02:00 1,020 (1,023+1,017)
061003 08:01 1,009 (1,013+1,006)

Av. = 1,005, StDev% = 3,48%

BL: 7, CI: 14, CL: 6 (6)
BB: 1 (14,29%), BCI: 2 (14,29%)
```

Here follows an explanation of the codes.

BL=Blanks, CI=Calibration Injections, CL=Calibrations, BB=Bad Blanks, BCI=Bad Calibration Injections.

Here you can get some statistics from the calibrations.

From the above statistics you can read that there has been one bad blank measurement.

There has been 6 good calibrations out of total 6 calibrations, despite two bad calibration injections.

8. How to decode the ISCUS log file

The Iscus log file is a simple text file that contains a number of short log entries (one line).

Each entry has a timestamp, a method number and an error number. The method and error numbers can be decoded using the tables below.

YYMMDD HH:MM [Method#] [Error#]

Entries in the log file are automatically deleted when the log file reaches a given size, so that the newest log entries are preserved.

The error numbers

The table below holds the error numbers that occur in the log file.

Error #	Description
1	Parameter(s) out of range
2	Home switch activated
3	Position error, a position sensor is unexpected Active
4	Position sensor timeout. Possibly a FPGA error.
5	Cannula sensor is unexpected High
6	Reagent door open
7	Reagent not inserted properly
8	Vial door open
9	Vial not inserted properly
10	Encoder timeout
11	Deviation between the encoder counter and the FPGA position counter
12	X-AXIS STEP MOTOR active
13	Z-AXIS STEP MOTOR active
14	SYRINGE STEP MOTOR active
15	VIALS in LOAD POSITION
16	*Not used*
17	Application error
18	Z-AXIS home sensor is not activated.
19	ISCUS configuration file error, wrong format.
20	ISCUS configuration file can't be found or opened.
21	Home sensor not activated
22	The Wash pump is active
23	The DC motor is already active
24	An undefined combination of sensor states has occurred.
25	Only one analog input at the time is allowed to execute.
26	The MCUConfiguration file contains error. Read the ISCUS_LOG.log for more information.
27	The sample rate for the analog input devices is longer then the Timeslot value that is used to calculate the average value.
28	A motor cannot fulfill a movement since Abort has been called.
29	REAGENT STEP MOTOR is active.
30	VIAL STEP MOTOR is active.
1001	TELECA Move Relative bug

Other errors

There are also some error entries on the form **YYMMDD HH:MM [Error]** where [Error] is described in the following table.

Error	**Description**
XHome n, where n is a number	Error during x-movement
XRel n, where n is a number	Error during x-movement
ZHome n, where n is a number	Error during z-movement
ZRel n, where n is a number	Error during z-movement
ZSens n, where n is a number	Error during z-movement
WashAsp n, where n is a number	Error during wash syringe movement
WashHome n, where n is a number	Error during wash syringe movement
WashDis n, where n is a number	Error during wash syringe movement
SyrHome n, where n is a number	Error during pipetting syringe movement
SyrAsp n, where n is a number	Error during pipetting syringe movement
SyrDis n, where n is a number	Error during pipetting syringe movement

Proposed Actions

The table below displays combinations of method numbers and errors and proposed actions if they occur.

Method #	Internal Name	Short Description	Error #	Error	Measures
1	GoTo-HomeX	Moves the cannula to the home position along the X-axis (left/right). The photo interrupter X-HOME POSITION defines the home position.	4	Timeout. X-home photo interrupter not activated.	Check for obstructions. Check X photo interrupter and connectors.
			10	Timeout. X-motor encoder does not move.	Check for obstructions. Check motor encoder and connectors.
			18	Z-home photo interrupter is not active (X-movement is forbidden so that the cannula is not broken).	Check z photo interrupter and connectors. Check Z conveyer belt.
			21	X-home photo interrupter not activated after movement limitation.	Check X photo interrupter and connectors.
2	GoTo-HomeZ	Moves the cannula to the home position along the Z-axis (up/down). The photo interrupter Z-HOME POSITION defines the home position.	4	Timeout. Z-home photo interrupter not activated.	Check Z conveyer belt. Check Z photo interrupter and connectors.
			5	Cannula sensor photo interrupter is unexpectedly active.	Check for obstructions. Check Z conveyer belt. Check Z photo interrupter and connectors.
			10	Timeout. Z-motor encoder does not move.	Check for obstructions. Check motor encoder and connectors.
			21	Z-Home photo interrupter is not active when the movement is completed.	Check for obstructions. Check Z conveyer belt. Check Z photo interrupter and connectors.
3	GoTo-HomeSyr	Moves the pipetting syringe to the home position. The photo interrupter SYRINGE HOME POSITION defines the home position.	4	Timeout. Pipetting syringe-home photo interrupter not activated.	Check syringe conveyer belt. Check syringe photo interrupter and connectors.
			10	Timeout. Pipetting syringe-motor encoder does not move.	Check for obstructions. Check motor encoder and connectors.
			21	Pipetting syringe-home photo interrupter not activated after the movement was completed.	Check syringe conveyer belt. Check syringe photo interrupter and connectors.

Method #	Internal Name	Short Description	Error #	Error	Measures
4	MoveRelativeX	Moves the cannula left/right.	1	Parameters out of range.	Check settings in database.
			2	X-HOME POSITION photo interrupter is unexpectedly activated.	Check X photo interrupter and connectors.
			10	Timeout. X-motor encoder does not move.	Check for obstructions. Check motor encoder and connectors.
			11	Deviation between the actual motor encoder position and the expected motor encoder position. This means that the motor did not manage to move to the desired position.	Check for obstructions. Check conveyer belt. Check motor encoder and connectors.
			18	Z-home photo interrupter is not active (X-movement is forbidden so that the cannula is not broken).	Check z photo interrupter and connectors. Check Z conveyer belt.
5	MoveRelativeZ	Moves the cannula up/down.	2	Z-HOME POSITION photo interrupter is unexpectedly activated.	Check photo interrupter and connectors.
			5	Cannula sensor unexpectedly activated.	Check for obstructions. Check photo interrupter and connections.
			10	Timeout. Z-motor encoder does not move.	Check for obstructions. Check motor encoder and connectors.
			11	Deviation between the actual motor encoder position and the expected motor encoder position. This means that the motor did not manage to move to the desired position.	Check for obstructions. Check conveyer belt. Check motor encoder and connectors.
6	MoveRelativeSyr	Moves the pipetting syringe (aspirate/dispense).	2	SYRINGE HOME POSITION photo interrupter is unexpectedly activated.	Check photo interrupter and connectors.
			10	Timeout. Pipetting syringe-motor encoder does not move.	Check for obstructions. Check motor encoder and connectors.

Method #	Internal Name	Short Description	Error #	Error	Measures
			11	Deviation between the actual motor encoder position and the expected motor encoder position. This means that the motor did not manage to move to the desired position.	Check for obstructions. Check conveyer belt. Check motor encoder and connectors.
7	MoveZRelativeCannula	Moves the cannula down until the the cannula sensor is activated (e.g. by a vial)	2	Z-HOME POSITION photo interrupter is unexpectedly activated.	Check photo interrupter and connectors.
			4	Timeout. Cannula sensor photo interrupter not activated.	Check Z conveyer belt. Check cannula sensor photo interrupter and connectors.
			5	The cannula sensor is active before the movement started	Check for obstructions. Check cannula sensor photo interrupter and connectors. Check database settings.
			10	Timeout. Cannula motor encoder does not move.	Check for obstructions. Check motor encoder and connectors.
			11	Deviation between the actual motor encoder position and the expected motor encoder position. This means that the motor did not manage to move to the desired position.	Check for obstructions. Check conveyer belt. Check motor encoder and connectors.
10	MoveRelativeWashPump	Moves the wash syringe (aspirate/dispense).	2	WASH HOME POSITION photo interrupter is unexpectedly activated.	Check photo interrupter and connectors.
			10	Timeout. Wash syringe motor encoder does not move.	Check for obstructions. Check motor encoder and connectors.
			11	Deviation between the actual motor encoder position and the expected motor encoder position. This means that the motor did not manage to move to the desired position.	Check for obstructions. Check conveyer belt. Check motor encoder and connectors.

Method #	Internal Name	Short Description	Error #	Error	Measures
11	GoTo-HomeWash	Moves the wash syringe to the home position. The photo interrupter WASH HOME POSITION defines the home position.	4	Timeout. WASH HOME POSITION photo interrupter not activated.	Check Z conveyer belt. Check photo interrupter and connectors.
			10	Timeout. Wash syringe motor encoder does not move.	Check for obstructions. Check motor encoder and connectors.
			21	WASH HOME POSITION photo interrupter is not active when the movement is completed.	Check for obstructions. Check conveyer belt. Check photo interrupter and connectors.
21	GetDetecSig		25	Only one analog input at the time is allowed to execute.	Report to CMA.
			27	The sample rate for the analog input devices is longer then the Timeslot value that is used to calculate the average value.	Report to CMA.
22	GetDetec-Temp		25	Only one analog input at the time is allowed to execute.	Report to CMA.
			27	The sample rate for the analog input devices is longer then the Timeslot value that is used to calculate the average value.	Report to CMA.
23	GetRefVolt-age		25	Only one analog input at the time is allowed to execute.	Report to CMA.
			27	The sample rate for the analog input devices is longer then the Timeslot value that is used to calculate the average value.	Report to CMA.
24	Get5V		25	Only one analog input at the time is allowed to execute.	Report to CMA.

Method #	Internal Name	Short Description	Error #	Error	Measures
			27	The sample rate for the analog input devices is longer then the Timeslot value that is used to calculate the average value.	Report to CMA.
25	Get24V		25	Only one analog input at the time is allowed to execute.	Report to CMA.
			27	The sample rate for the analog input devices is longer then the Timeslot value that is used to calculate the average value.	Report to CMA.
26	Get0V		25	Only one analog input at the time is allowed to execute.	Report to CMA.
			27	The sample rate for the analog input devices is longer then the Timeslot value that is used to calculate the average value.	Report to CMA.
27	GetTemp		25	Only one analog input at the time is allowed to execute.	Report to CMA.
			27	The sample rate for the analog input devices is longer then the Timeslot value that is used to calculate the average value.	Report to CMA.
31	Run-WastePump	Runs the waste return pump. (DC-motor that empties the washbin)	10	Timeout. Waste return pump encoder does not move.	Check the wash bin sensor, wipe it off. Check the waste tubing.
			23	The DC motor is already active	Report to CMA.
43	UpdateConfigFiles	Reads the hardware configuration file	19	ISCUS configuration file error, wrong format.	Check file integrity. Report to CMA.
			20	ISCUS configuration file can't be found or opened.	Check file integrity. Report to CMA.

Method #	Internal Name	Short Description	Error #	Error	Measures
			26	The MCUConfiguration file contains error. Read the ISCUS_LOG.log for more information.	Check file integrity. Report to CMA.
54	GoToHomeReagent	Moves the reagent rack motor to the home position. The photo interrupter REAGENT HOME POSITION defines the home position.	4	Timeout. Reagent rack home photo interrupter not activated.	Check reagent conveyer belt. Check reagent home photo interrupter and connectors.
			7	The reagent rack hit the bar when going inwards.	
			10	Timeout. Reagent rack motor encoder does not move.	Check motor encoder and connectors.
			21	REAGENT HOME POSITION photo interrupter is not active when the movement is completed.	Check for obstructions. Check conveyer belt. Check photo interrupter and connectors.
55	GoToHomeVial	Moves the vial rack motor to the home position. The photo interrupter VIAL HOME POSITION defines the home position.	4	Timeout. Vial rack home photo interrupter not activated.	Check vial conveyer belt. Check vial home photo interrupter and connectors.
			7	The vial rack hit the bar when going inwards.	
			10	Timeout. Vial rack motor encoder does not move.	Check motor encoder and connectors.
			21	VIAL HOME POSITION photo interrupter is not active when the movement is completed.	Check for obstructions. Check conveyer belt. Check photo interrupter and connectors.
56	MoveRelativeReagent		1	The command would result in a position outside the valid area.	Report to CMA. Check definition of positions in the database.
			2	REAGENT HOME POSITION photo interrupter is activated during movement.	Check for obstructions. Check conveyer belt. Check photo interrupter and connectors.
			7	The reagent rack hit the bar when going inwards.	
			10	Timeout. Reagent rack motor encoder does not move.	Check motor encoder and connectors.

Method #	Internal Name	Short Description	Error #	Error	Measures
			11	Deviation between the actual motor encoder position and the expected motor encoder position. This means that the motor did not manage to move to the desired position.	Check for obstructions. Check conveyer belt. Check motor encoder and connectors.
57	MoveRelativeVial		1	The command would result in a position outside the valid area.	Report to CMA. Check definition of positions in the database.
			2	VIAL HOME POSITION photo interrupter is activated during movement.	Check for obstructions. Check conveyer belt. Check photo interrupter and connectors.
			7	The vial rack hit the bar when going inwards.	
			10	Timeout. Vial rack motor encoder does not move.	Check motor encoder and connectors.
			11	Deviation between the actual motor encoder position and the expected motor encoder position. This means that the motor did not manage to move to the desired position.	Check for obstructions. Check conveyer belt. Check motor encoder and connectors.

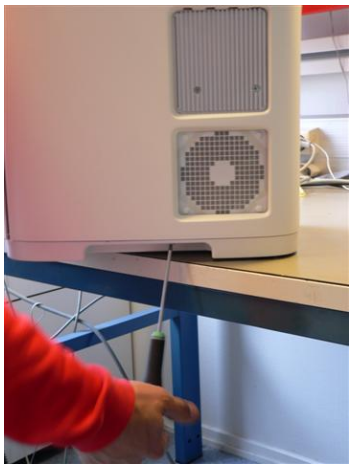
9. Check/ Replacement of parts and modules

9.1 How to remove the main cover

Tools: Below are the required tools for removing the covers.

1. Remove the two T-20 screws for the handle. Remove the handle.

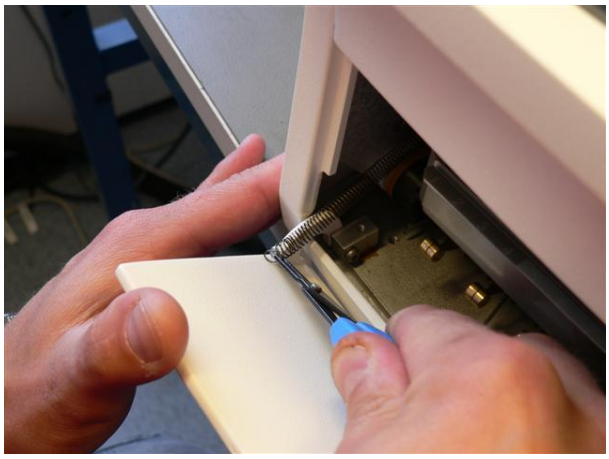
2. Remove the T-20 bottom screw that holds the rear cover.



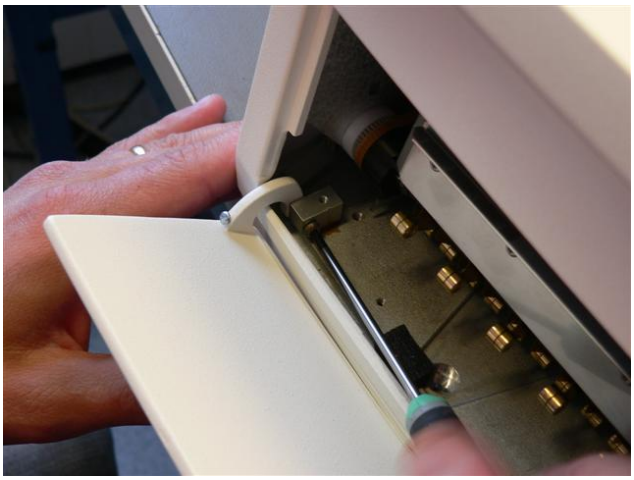
3. Remove the two upper T-25 screws that holds the rear cover. Remove the rear cover.

4. Open the front lid.

5. Remove the end of the spring from the hinge.

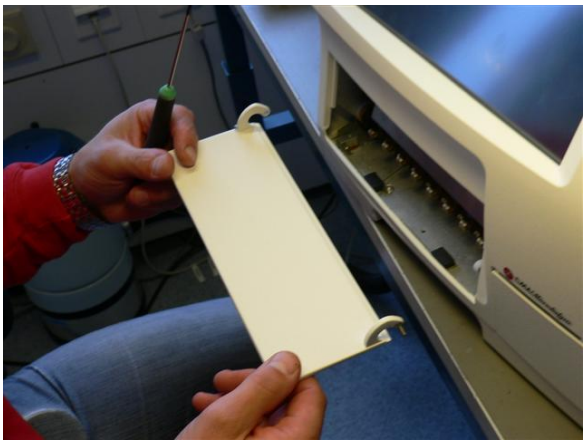


6. Unscrew the T-10 screw until it unhooks from the left hinge.

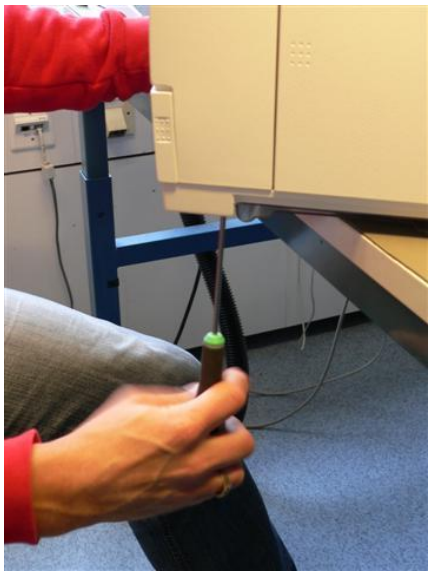


7. Remove the right T-10 screw. Make sure that the small bushing in the hinge not falls off.

8. Remove the front lid.

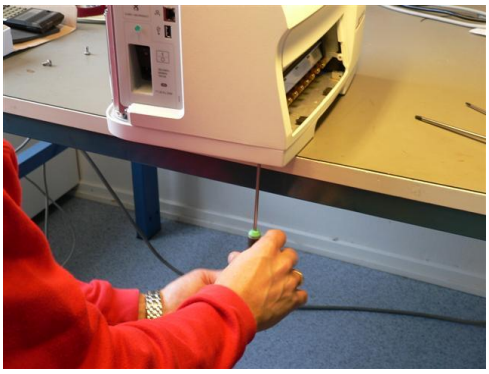


9. Unscrew the T-20 screw on the right side of the bottom. Don't remove the screw completely just release it five turns.



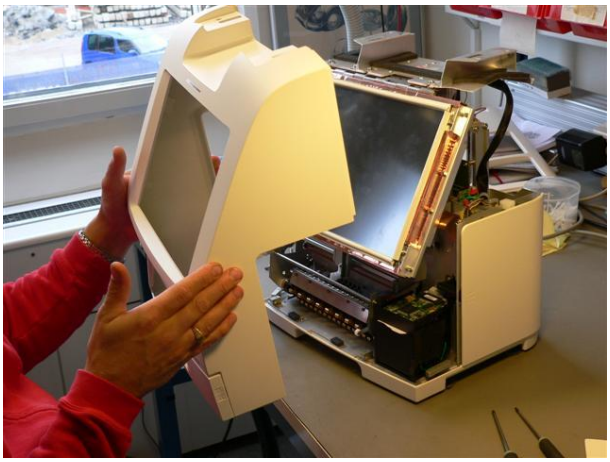
10. Unscrew the T-20 screw on the rear left side of the bottom.
Don't remove the screw just release it five turns.

11. Do the same with the front right screw.



12. Remove the two T-25 screws at the top of the front cover.

13. Remove the front cover from the ISCUS Flex.



14. When reassembling make sure that the monitor is positioned correctly. (As far back as possible and the adjustment screws in the rails). Start to tighten the lower right screw, the two top screws and then the lower left screws.

9.2 Check/Replacement of Cannula

In User software mode:

1. Go to the cogwheel menu . Press “Maintenance” and then the “Sample cannula” button.
2. Press the “Open” button. The front lid will open. Remove the inspection/ cannula lid and follow the instructions on the screen.
3. Push the release handle on the right side of the cannula holder and remove the old cannula.
4. If the old cannula is supposed to be used again: Check the flow of the cannula by connecting it to a syringe filled with destilled water and flush the cannula.
5. Check that the old cannula is straight and the tip is undamaged. If the old cannula does not fulfil these criteria, replace it.
6. Insert the new cannula. First place the sharp end of the new cannula into the cannula guide. Then lift and push up the ferrule end of the new cannula, until it locks in the correct position.
7. The ISCUS will now perform two calibrations, the second one after 30 minutes. This is also a way to do if you want to calibrate twice independently of the calibration interval.

In service software mode:

1. Press the “service” tab.
2. Press the “Replace Cannula” button.
3. Remove the inspection lid by hand.
4. Remove the cannula from the holder.
5. If the old cannula is supposed to be used again: Check the flow of the cannula by blowing it or connect it to a syringe filled with distilled water.
6. Check that the old cannula is straight and the tip is undamaged. If the old cannula does not fulfil these criteria, replace it.

7. Insert the new cannula in the holder. Push up the cannula until it locks in the correct position.
8. Put the inspection lid back.
9. Then close the lid by pressing "End Change cannula".
10. If you have a reagents cassette inserted the ISCUS will now perform two calibrations, the second one after 30 minutes.

9.3 Check/Replacement of syringes

Sample syringe 500 µl (the left one from the backside):

1. Remove the handle and the rear cover of the ISCUS analyser.
2. Check that the syringe does not have any leakage. If there is any liquid between the piston and the glass tube, replace the syringe
3. Enter the service software mode and press the "Service " tab.
4. Press " Replace syringes". The syringes will now go down so it will be possible to remove them.
5. Disconnect the syringe piston from the drive module. Just turn the hex nut on the syringe piston counter clockwise and unscrew it.
6. Disconnect the syringe body from the upper holder.
7. Examine the syringe for cracks or leakage between the glass tube and the piston.
8. Fill the new syringe with rinsing fluid and make sure that no air bubbles are visible in the syringe before attaching it to the ISCUS.
9. Mount the new syringe into the upper holder; tighten it gently with a plier. A too hard tightening can cause damage to the syringe glass body and plastic threads.
10. Mount and secure the syringe piston into the drive module.
11. Press " End replace syringe". The syringes will now move to the adjustment position.
12. Unlock the insex screw, which locks the syringe adjustment screw. Screw the syringe piston up until it hits the seat of the syringe holder. Then back the piston down one half of a complete turn before the insex screw is locked again.
13. Press " End adjust Syringes". The syringes will make a flush.

Wash syringe 1ml (the right one from the backside):

1. Check that the syringe does not leak. If there is any liquid between the piston and the glass tube, replace the syringe.
2. Enter the service software mode and press the "service " tab.
3. Press " Replace syringe". The syringes will now go down so it will be possible to remove them.
4. Disconnect the syringe piston from the drive module. Just turn the hex nut on the syringe piston counter clockwise and unscrew it.
5. Disconnect the syringe body from the upper holder.
6. Examine the syringe for cracks or leakage between the glass tube and the piston.
7. Fill the new syringe with rinsing fluid and make sure that no air bubbles are visible before attaching the syringe into the ISCUS.
8. Mount the new syringe into the upper holder; tighten gently with a plier. A too hard tightening can cause damaging of the syringe glass body.
9. Mount and secure the syringe piston into the drive module.

10. Press " End replace syringe". The syringes will now move to the adjustment position.
11. Unlock the insex screw, which locks the syringe adjustment screw. Screw the syringe piston up until it hits the seat of the syringe holder. Then back the piston down one complete turn before the insex screw is locked again.
12. Press " End adjust Syringes". The syringes will now make a flush.
13. Mount the rear cover and the carry handle of the ISCUS analyser.

9.4 Check/Replacement of Syringe pumps modules

Check of the Syringe pump module

1. Open the service software mode and enter the "Service" tab
2. Press either "Wash x 10" or "Wash" to check that the wash syringe is working properly.
3. Check for air in the syringe. If there are large air bubbles in the syringe even after several flushes, check that the syringe is tightened correctly and no cracks are visible in the glass body. The air can also depend on a faulty solenoid valve.
4. Press "Replace syringe" and the syringes will go down and make it easy to check if any bubbles are present on top of the pistons. Then press "End replace syringes" and "End adjust syringes" to get back.

Replacement of the Syringe pump module

1. Remove the rear cover of the ISCUS Flex analyser.
2. Remove the Peek tubing connectors from the syringe pump module. (Rinse fluid bottle-valve solenoid and detector- sample syringe).
3. Disconnect the cables for the syringe pump module.
4. Remove the mounting screws for the syringe pump module.
5. Remove the syringe pump module.
6. Place the new syringe pump module and secure it with its mountings screws.
7. Connect the cables for the new syringe pump module.
8. Mount the Peek tubings: Rinse fluid bottle-valve solenoid and detector- sample syringe.
9. Mount the rear cover of the ISCUS.

9.5 Check/Replacement of the Solenoid Valve

Check of the Solenoid Valve

1. Enter the service software mode and enter the "Service" tab
2. Press "Wash x 10" to check that no air is visible in the wash syringe after ten cycles.
3. If there are large air bubbles in the syringe even after ten flushes, check that the syringe is tightened correctly and no cracks are visible in the glass body.
4. If there are still large amount of air in the syringe, check the connections to the solenoid valve.
5. If the connections are tightened and still lots of air in the syringe, replace the valve.

Replacement of the Solenoid Valve

1. Remove the rear cover of the ISCUS analyser.
2. Remove the Peek tubing connections on the valve.
3. Remove the mounting screws for the valve.
4. Remove the valve from the syringe pump module.
5. Place the new valve on to the pump module.
6. Reassemble in the opposite order.

9.6 Check/Replacement of Detector cell

Check of the detector cell

1. Open the service software mode. Type in the password “main” and enter “Step 3”
2. Check the signal levels for VIS and UV by choosing VIS or UV in the menu 10 “Adjust the LED light levels” and Press “Start”.
3. If the signal levels for VIS and UV are below 1000 mV with the maximum output, it may help to increase the signal level if performing a cleaning of the detector cell. See chapter 10. Cleaning instruction. Check also that there is not any leakage from the cell due to a broken glass tube in the cell.
4. Make a calibration.
5. Print the log file and check that the water values are stable (better than 0,3% deviation).

Replacement of the Cell

1. Remove the main cover of the ISCUS analyser.
2. Remove the cannula. See replacement of cannula instruction.
3. Remove the peek tubing from the cannula holder.
4. Remove the peek tubing from the valve solenoid on the syringe pump module.
5. Remove the mounting screws for the detector cell.
6. Remove the detector cell from the detector unit.
7. Reassemble in the opposite order.
8. Start up the instrument and make a centre volume calibration. See “ Service software mode”.

‘

9.7 Check/Replacement of Detector module

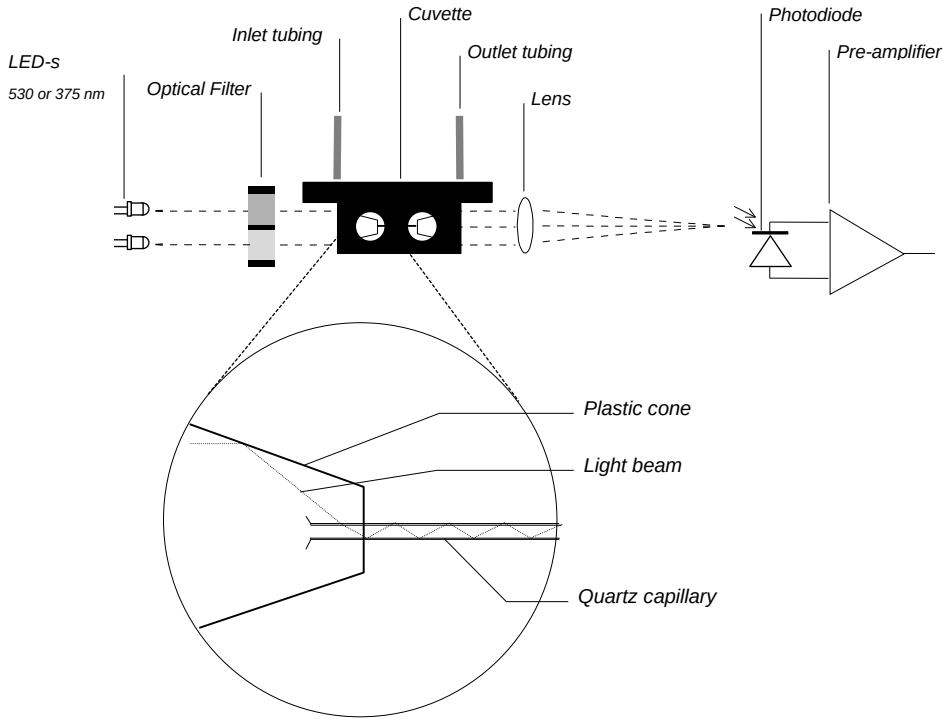


Figure 1. Principle of the optical system

The optical system of ISCUS is equipped with a single-beam filter photometer.

Two Class 1 Light Emitting Diodes (LED), with wavelengths of 530 and 375 nm receptively, are used as the light source. The active LED (530 or 375 nm) is determined by the analytical method.

The light beam passes through an optical filter and then through the cuvette. Passing through the optical lens, the light beam then reaches the photodiode where it is converted to an electrical signal. The electrical signal is pre-amplified in the detector unit before the signal is passed to the analogue-to-digital converter.The measuring cuvette is designed to minimise the risk of getting air bubbles trapped. The light beam enters the cuvette through a plastic cone and is reflected, by total internal reflection, into the quartz capillary. Then, it passes through the quartz capillary, containing the sample, in a zigzag pattern also by total internal reflection between quartz and air. The effective volume of the cuvette is about 2 µL and the geometric path length 10 mm. The effective path length is shorter however, about 8 mm, since a part of the travel through the capillary occurs in the quartz wall. The temperature of the optical unit is controlled to 37 °C.

Check of the detector

1. Print out the service log and check the water levels, or open the service software mode and the Step 3 tab/ 10 “Adjust the LED light levels”. Press “Start” and check the signal levels for VIS and UV.
2. Are the water/signal levels higher than 1000 mV the ISCUS is capable of running analyses. If the water levels are below 1000 mV, increase the intensity of the LED-diodes by turning the potentiometers on the detector unit. Left-VIS and Right-UV.
3. If it is not possible to get any higher signal level than 1000mV by increasing the tension of the diodes it could depend on a dirty detector cell, broken detector cell, faulty pre-amplifier or broken diode CB. Before doing anything else with the trim pots make sure that the fault is not caused by any of the above mentioned. See also chapter 10. Cleaning instruction.

Replacement of the detector

1. See replacement of detector cell.
2. Remove all screws from the radiation shield, which are above the XZ-module.
3. Bend out the radiation shield to make access to the three mounting screw on the backside.
4. Disconnect the cables from the main board. Remove the detector.

5. Connect the cables for the new detector module; Photo sensor board-con8 on main board, J3 on detectormodule-con49 on main board and the flat cable from diode board on detector module to con 5 on the main board.
6. Reassemble as “Replacement of Detector cell”.

9.8 Check/Replacement of XZ-module

Check of the XZ-module

1. With the ISCUS shut down and the power off, check that the cable connections for the motors are connected properly on the main board.
3. Check manually that Reagent holder, X, and Z movements can be moved freely without any “high resistance spots”.
4. Start the ISCUS and enter the service software mode and open the “service” tab.
5. Start the sensor check and check that all sensors in the XZ-module works correctly.
6. If there are still position errors from the module, replace the complete motor and encoder for that specific movement.

Replacement of the XZ-module

1. Remove the main cover of the ISCUS analyser. See how to remove the main cover.
2. Unlock the two screws at the bottom of the XZ-module and one screw on the support arm.
3. Remove the cannula and the peek tubing from the cannula holder.
4. Disconnect the cables to and from the XZ-module.
5. Remove the XZ-module from the chassis.
6. Place the new XZ-module into the chassis.
7. Reassemble in the opposite order.

9.9 Check/Replacement of Main board

Check of main board

1. Check that all cable connections are connected properly.
2. Check that it has not been any leakage on the board from rinse fluid or old reagents.
3. Check that the Smart Media card and the small memory battery are installed on the board.
4. Check the XZ-motor functions by following Check of XZ-module.
5. Check the syringe pump functions by following Check of syringe pump module.
6. Check the functions of the rinsing fluid system by following Check of Rinsing fluid system.
7. Start up the system and check that the windows software and ISCUS software starts up correctly.

Replacement of main board

Warning!! Use ESD protection before working with the mainboard.

1. Remove the main cover of the ISCUS analyser. See instruction.
2. Remove the XZ-module. See Replacement of XZ-module.
3. Remove the radiation shield and the detector module. See Replacement of the XZ-module.
4. Disconnect the cables to and from the main board.
5. Remove the mounting screws for the main board and adjustment screw for the monitor.
6. Remove the main board from the chassis.

7. Place the new main board into the chassis.
8. Reassemble in the opposite order.

9.10 Check/Replacement of Power supply

Check of the Power supply.

1. Check that all cable connections are correctly connected to the power supply.
2. Start up the ISCUS and measure the voltage on Con 29 on the Main board.

CON29, Power supply unit

No	Name	REF_DES
1	-12V	-12V
2	+5V	+5V
3	+5V	+5V
4	+5V	+5V
5	GND	GND
6	GND	GND
7	GND	GND
8	GND	GND
9	+12 V	+12 V
10	+24 V	+24 V

3. If there are not any voltage levels on these test points please check the fuses in the main inlet.

Replacement of the Power supply

4. Remove the rear cover of the ISCUS analyser.
5. Remove the transparent cover.
6. Remove the four mounting screws (T-20), which are holding the power supply to the chassis.
7. Disconnect the cables from the top of the power supply first and then the lower connection.
8. Remove the ground connection from the power supply.
9. Remove the power supply from the chassis.
10. Place the new power supply into the chassis.
11. Reassemble in the opposite order.

9.11 Replacement of Fan

1. Remove the rear cover of the ISCUS analyser.
2. Remove the screws for the syringe module and lift it out from the chassis, still hanging in the cables.
3. Remove the transparent cover from the top of the power supply.
4. Remove the power supply, see replacement of power supply.
5. Remove the screws for the house of the power supply and fan.
6. Disconnect the Fan cable.
7. Pull out the rivets which are holding the Fan to the housing.
8. Place the new Fan into the chassis.
9. Reassemble in the opposite order.

9.12 Check / Replacement of Rinse / Waste module

Check of Rinse / Waste module.

1. Open the service software mode, see chapter 6, and the "Module test" tab.
2. Start the "Chassis/ Cover" test and follow the instructions on the screen. This test will check all switches for the rinse/ waste module.
3. Replace the circuit board if any of the switches are broken.

Replacement of the Rinse/ Waste level sensors.

1. Remove the main cover of the ISCUS analyser. See chapter 9.1 How to remove the main cover.
2. Remove the screws, which are holding the syringe pump module. Lift out the syringe pump module still hanging in the cables and Peek tubings.
3. Remove the red lift handle.
4. Remove the two screws for the two slide bearings and lift out the Rinse / Waste level sensors. See picture below.

5. Disconnect the cables and Peek tubings from the Rinse/ Waste level system.
6. Remove the Rinse/ Waste level sensors from the chassis.
7. Reassemble in the opposite order.

9.13 Check/Replacement of Display module

Check of the display module

1. Turn on the ISCUS.
2. The display shall light up after 15 to 30 seconds.
3. If the display has not lightened up, check that the dimmer wheel on left side of the ISCUS is not set in the darkest mode.
4. Check all cable connections to the screen.
5. Check that the Smart-media-card is mounted on the main board.
6. Replace the display module if nothing of the above mentioned helped.
7. The problem can also depend on a faulty main board.

Replacement of the display module

1. Remove the main cover of the ISCUS analyser.
2. Disconnect the cables to and from the Display module.
3. Remove the mounting screws for the Display module.
4. Remove the Display module from the chassis.
5. Place the new Display module into the chassis.
6. Mount and secure the mounting screws for the new Display module.
7. Connect the cables to and from the new Display module.
8. Mount the main cover of the ISCUS analyser.

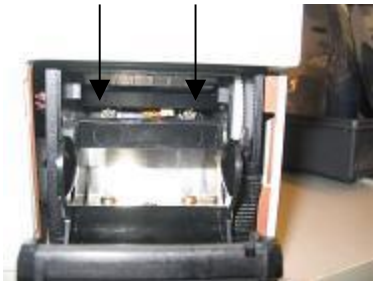
9.14 Check/Replacement of Printer

Check of the Printer

1. Press " Print log file" and check that the printer works.
2. If it does not print, check that the paper is installed correctly and flat printer cable is not damaged.
3. If the release button on the front lid of the printer is pressed slightly, the printer shall feed the paper.
4. Replace the printer if it is still not responding.

Replacement of the Printer

1. Remove the main cover of the ISCUS analyser. See 9.1 how to remove the main cover.
2. Remove the mounting screws for the Printer. The screws can be reached when the printer is opened and the printer paper is removed. See picture below.



3. Disconnect the cable from the Printer.
4. Remove the Printer from the chassis.
5. Place the new Printer into the chassis.
6. Reassemble in the opposite order.

10. Cleaning instructions

10.1. General cleaning instruction

1. Turn off the ISCUS analyser and disconnect the power cord.
2. Remove the cover of the ISCUS analyser.
3. Brush the dust off from the fan filter. Make sure that no dust is inside the ISCUS Flex.
4. Clean the following parts with 70% ethanol:
   A. Cannula guide.
   B. All the sliding surfaces of the XZ-module.
   C. All the visible surfaces from the outside.

10.2. Disinfecting and cleaning of the detector cell and liquid system

1. Activate the service software mode by pressing the "Maintenance button" and type the following code; 1, shift, A, 2, shift, B and 3.
2. Open the "Step 4" tab. Open the reagent lid by pressing "Reagent"
3. Load the ISCUS analyser with a cleaning cassette, See **"Cleaning Cassette"** below how it can be made.
4. Use cassette code and choose the "Cleaning" option on the screen.
5. Press "OK" and the cleaning procedure will start.

Cleaning Cassette

Required items

- One empty reagent cassette
- 1 mol/L Sodium Hypochlorite in 0.1 mol/L NaOH (e.g. BDH 23039)
- Diluted (3.5 mol/L) nitric acid
- Two screw caps with membrane

Procedure

1. Fill the vial to the right (Calibrator position) with 10 % Sodium Hypochlorite solution.
2. Fill the vial to the left (Reagent 1 position) with diluted nitric acid.
3. Close the vials with the screw caps.

11. Ciruit board list

8001870 PBA CMA 600 Heat

8001833 PBA CMA 600 LED

8002603 PBA Display adapter New

8002338 PBA ISCUS Backlight unit

8003152 PBA ISCUS Flex Bottle sensor

8003175 PBA ISCUS Flex Connection

8003210 PBA ISCUS Flex Vial Sensors

8003189 PBA ISCUS Flex Wash Basin

8001871 PBA ISCUS Photo diode

8002674 PBA ISCUS Light switch

8001923 PBA ISCUS Syringe pump

8001705 PBA ISCUS Home X

8001758 PBA ISCUS Sensor Z

8003323 PBA Main Board ISCUS 4

8003227 PBA Z-motor

If you need specific information of any circuit board please contact CMA Service Department

12. Cable connections

Internal cables and connections for ISCUS Flex

Function/Name	Cable P/N	From	To	Note
X-motor	-	8003323--con 61	8002690	XZ-module, X-motor
X-encoder	8002460	8003175--J1	8002690	XZ-module X-encoder
Z-motor	-	8003227--J4	8002690	XZ-module, Z-motor
Z-encoder	8002461	8003227--J5	8002690	XZ-module, Z-encoder
Reagent-motor	-	8003323--con 61	8002690	XZ-module, Reag-motor
Reag-encoder	8002462	8003175--J5	8002690	XZ-module Reag-encoder
Hatch-motor	-	8003323--con 61	8002690	XZ-module, Vial-motor
Hatch-encoder	8002463	8003175--J4	8002690	XZ-module, Vial-encoder
Z-motor- XZ-conn. cable	8002396	8003227--J3	8003175- J3	XZ-module,
Z-flat cable	8001895	8003227--J2	8001758-J1	XZ-module
XZ-flat cable	8002513	8003323--con 12	8003175-J2	Fixed on XZ-conn. board
Z-motor cable	8002515	8003323--con 61	8003175-J12, J13, J14	Fixed on XZ-conn. board
Vial sensors	8003329	8003323--con 22	8003175-J8	XZ-module, vial sensors
Wash bin	8002506	8003175—J9	8003189-J3	Fixed on PCB
Home-X	8002507	8003175--J11	8001705-J1	XZ-module
Detector diodes	8002270	8003323--con 8	8001833-J1	Detector module
Pre-amplifier	8002269	8003323--con 5	8001871-J1	Detector module
Cell heat power	8002600	8003323--con 49	8001825-J3	Detector module
Wash syringe pump- motor	-	8003323--con 62	8002650	Syringe pump module Wash motor
Wash syringe pump-encoder	8002464	8001923--J3	8002650	Syringe pump modul Wash encoder
Sample syringe pump motor	-	8003323--con 62	8002650	Syringe pump module Sample motor
Sample syringe pump encoder	8002464	8001923--J4	8002650	Syringe pump modul Sample encoder
Rinsing bottles sensors	8002509	8001923--J5	8003152-J1	Fixed on PCB
Function/Name	**Cable P/N**	**From**	**To**	**Note**
Fluid lever sens.	-	8001923--J2	8001970	Rinse/ Waste module

Syr. pump sens.	8002520	8003323--con 13	8001923-J1	Fixed on CB
Return pump	-	8003323--con 62	8002650	Syringe pump module, cable fixed on pump
Solenoid valve	-	8003323--con 62	8002650	Syringe pump module, fixed on valve
Printer	8002454	8003323--con 25	8001948	Cable to Printer
Fan	-	8003323--con 9	8001894	Cable fixed to Fan
Main power sw.	8002468	8002605	8001877--J1	Power supply module
Power supply	8002602	8001877--J3	8002604--con 29,Green led.	Power"Green" led included in cable.
Power fail	8002598	8003323—con 60	8001877—J2	Is not in use yet
Main board.-Pot	8002757	8003323—con 30	Potentiometer	Light Potentiometer
Backlight-Pot	8002758	Potentiometer	8002630	Cable fixed at LCD
LCD	8002781	8003323—con 54	LCD-module	Cable fixed at LCD

Ground cables

Function	**Cable P/N**	**From**	**To**	**Note**
Main power inlet.	8002497	Main power inlet	Chassis	
XZ-module	8002800	XZ-module	Chassis	
Rinse/ Waste module	8002800	Rinse/ Waste module	XZ-module	
Syringe pump module	8002800	Syringe pump module at the bottom.	Chassis	
Power supply	8002800	Power supply	Syringe pump module at the top.	
Ground connection wire	8002805	Chassis	Power supply	

13. Control of ISCUS Flex Analyser

To check the performance of the ISCUS Flex it is recommendable to put in a control sample bottle.

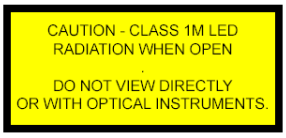
You can do it in two different ways.

1. **Put in a Control sample bottle in the reagent holder at the same time you change reagents or prepare a vial with control liquid and run it as a normal sample for the patient.**
2. **Check Control samples information for correct levels. The information sheet is enclosed with each control sample package.**

14. Safety

- **National standards and local directions must be fulfilled at installation and service.**
- **Follow the packaging/ un-packaging procedure to avoid personal injuries, equipment damage or property damage.**
- **Never use the device near mobile telephones, CB radios or other forms of radio communication and/or electromagnetic fields. These may affect the performance of the device. The analyser conforms to EN 60601-1-2, IEC 61326 and shall not be exposed to higher levels of disturbance.**
- **Regarding emitting electronic fields, ISCUS fulfils Class B according to EN-60601-1-2, IEC 61326 if Ethernet and RS 232 cables are not longer than 3 m.**
- **Do not immerse the device in water or any other liquid (See the cleaning instruction for specific details).**
- **The power cord also serves even when the main power switch is switched off, i.e. disconnect power cord to set power completely off.**
- **Disconnect the power cord before cleaning or servicing.**
- **Do not connect the power cord to anything else than the appropriate input of the device.**
- **The device is only to be used with medical equipment complying with EN 60601-1, EN 60601-1-2, and IEC 60950 (Computer equipment).**
- **If other equipment is connected to ISCUS in a patient environment, the installation must fulfil leakage current and electrical separation requirements according to EN60601-1-1, e.g. by using a separation device. The RS-232 serial port and Ethernet port are galvanically isolated from the internal secondary circuits of ISCUS with basic insulation according to the requirements of IEC 60950, withstanding 1500 V. The USB port is not galvanically isolated from the internal circuits within ISCUS.**

  The USB port is intended for service purposes. It shall only be used as specified by CMA Microdialysis AB.
- **The device is not intended for use with flammable anaesthetic gases. A possible explosion hazard exists and personal injury or equipment damage could occur.**
- **The analyser shall not be exposed to direct sunlight nor be placed in a draughty environment.**
- **To shut down ISCUS before any transportation the "Turn off" button must be used. Follow the instructions on the screen, empty wash/waste bottles, remove reagent cassette and microvials. Never transport ISCUS with fluids remaining inside**
- **The analyser shall never be transported if the transport conditions are to less than 0 degrees Celsius (32 degrees Fahrenheit).**
- **Use only CMA Microdialysis spare parts, accessories and consumables.**
- **All service shall be perform by CMA Microdialysis authorised personnel.**
- **Handling of samples shall follow hospital infection risk procedures.**
- **WARNING. Class 1 LED product. LED placed in the detector module of ISCUS. Radiation when open, do not view directly or with optical instruments.**



- **The use of ACCESSORIES, transducers and cables other than those specified, with the exception of transducers and cables sold by CMA Microdialysis AB as replacements parts for internal components, may result in increased EMISSIONS or decreased IMMUNITY of ISCUS. ISCUS should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, ISCUS should be observed to verify normal operation in the configuration in which it will be used.**

Waste disposal

Biological risk.

- **Rinsing and waste fluid can be disposed as water unless there is a risk for infection.**

  NOTE! The Waste fluid may be contaminated with e.g. hepatitis. Be sure to use normal hospital routines.

  If hospital requirements do not permit you to reuse the waste bottle, replace it with a new empty bottle using the cap of the new bottle to seal the old bottle.

- **Reagents and calibrator can be disposed as normal waste**
- **Microvials can be disposed as normal waste unless there is a risk of infection.**

  NOTE! The samples may be contaminated with e.g. hepatitis. Be sure to use normal hospital routines.

- **Paper rolls can be disposed as normal waste**
- **The sample cannula shall be disposed according to hospital routines for needles**
- **For disposal of the Analyzer or parts of it, contact your CMA representative**

Transportation and Packaging

- **For transportation outside the hospital use the original interior and exterior packaging.**
- **The package shall be transported upright and carefully.**

NOTE! Before transporting ISCUS you need to follow the shutdown procedure.

The shutdown procedure activates a transport security lock that prevents the sample cannula from moving and getting damaged.

By emptying the wash/waste bottles and removing the reagent cassette you also reduce the risk of equipment damage, which is not covered by any service or warranty agreement.